

# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

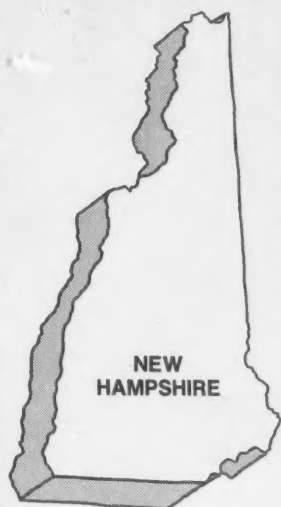
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NEWSPAPER



## Frugal State Pours Millions Down DP Drain

By Bill Laberis  
CW Staff

CONCORD, N.H. — Acting on a consultant's recommendation, New Hampshire spent more than \$2.5 million on a computer system that is largely outdated, unworkable and inoperable.

And the state will probably have to spend at least half that amount again to get a functioning system for the State Liquor Commission up and running.

These are two of the findings in a not-yet-released report outlining the SLC's futile efforts to install an automated inventory and distribution control system beginning in late 1979. The SLC is the second largest revenue producer in New Hampshire, a state known for flaunting its prudent government spending habits.

During the implementation at—  
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## DP Technology Creates More Jobs Than It Replaces, BLS Study Finds

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Computer-related job displacement in the U.S. over the last 30 years has been more than offset by jobs created in new industries and by heightened productivity in established economic sectors, according to a new study from the U.S. Department of Labor.

The department's Bureau of Labor Statistics did concede in its study that technological innovation has eliminated jobs in some industries and caused a certain amount of "painful" employment adjustment. But, BLS said, "on balance, there is general agreement that the benefits of new technology far outweigh the disadvantages and that innovation has led to economic progress, new job opportunities and a more prosperous society."

The study was presented in Paris late last month at a special session on information technology, productivity, working conditions and employment called by the Organization for Economic Cooperation and Development. The meeting reflected the concerns of European nations that are facing high unemployment and that fear the fast pace of technological development is outrunning traditional mechanisms for adjusting to changing economic conditions.

### Steady Progress

As part of the U.S. presentation at the meeting, however, the BLS report contended that between 1950 and 1980 "a steady stream of technological progress... has resulted in higher productivity, elimination of many menial and dangerous jobs, higher wages and shorter hours and a continuous flow of new products and services, which have resulted in a higher standard of living."

In general, BLS said, it has long been recognized that while technological change is an important factor, "the general level of demand for

goods and services is by far more important in determining the number of persons unemployed and the length of their unemployment."

During the last 30 years, "when new technologies were developed and diffused widely in plants and offices," employment in nonfarm busi-

ness sectors increased by 77%, from 43.7 million to 77.2 million workers, according to the BLS figures. During that period, output increased by 177%.

Turning directly to the effect of computers on the work force, the  
(Continued on Page 6)

## HP Unleashes Product Blitz Starting With Two 3000s

By Tim Scannell

CW Staff

PALO ALTO, Calif. — Hewlett-Packard Co. last week expanded the range of its HP 3000 systems in both directions by introducing entry-level and high-end computer systems said to be up to 2.5 times more powerful than the previous low-end and high-end systems.

At the same time, the firm beefed up its HP 3000 Series 44 computer by announcing it would use 64K-bit chips and 1M-byte memory boards in the system's construction. HP also said it would lower the price tag on the Series 44 by about 13%.

The new systems are described as the backbone of HP's more aggressive thrust into office automation. When tied with the communications and software products also introduced by the firm last week (stories on Pages 4 and 5), the systems form networks that process numbers, words and graphics and can be used by both the data processing and office management staffs, HP President and Chief Executive Officer John A. Young said.

HP has termed its renewed business computer strategy "The Interactive Office," which the company defined as "a step beyond office automation."

The HP 3000 Series 64 distributed mainframe system replaces the Series 44 as HP's top-of-the-line model. Un-

like other computers in the HP 3000 lineup, the Series 64 sports a 32-bit data bus, a 32-bit word size and a dual arithmetic-logic unit (ALU) capable of performing 32-bit functions. However, while the Series 64's 32-bit hardware elements reportedly place the computer into the one million in—  
(Continued on Page 4)

## Amdahl Returns IBM 3081 Volley

By Tim Scannell

CW Staff

SUNNYVALE, Calif. — Amdahl Corp. last week expanded its 580 systems family by introducing a mid-range attached processor that competes directly with IBM's recently introduced 3081 Model Group K computer [CW, Oct. 26].

At the same time, the firm announced that:

- It will support IBM's 370 extended 31-bit architecture and MVS/System Product (SP) Version 2, and VM/SP Releases 1 and 2 operating system software.

- It has cut purchase prices by as much as 14% on all its previous systems, including the Models 5860 and 5880.

The 580/5870 computer, which actually consists of a 5860 processor  
(Continued on Page 8)

## The Tax Act — What's in Store for DP Departments?

By Brad Schultz

CW New York Bureau

DP departments may be swamped by a need for financial software revisions unless ongoing liaison is maintained with experts in financial departments.

A Management Sciences America, Inc. executive issued that warning in a telephone interview last week, explaining that the requirement for financial software modifications comes from

tax law changes enacted this year.

Dennis W. Vohs, MSA's group vice-president for technical operations, said the Economic Recovery Tax Act of 1981 specifies new rules for depreciation of capital equipment, such as computer hardware, and provides tax credits for investment in new systems, under certain conditions.

Ongoing liaison with tax and accounting experts al-

lows DP managers to anticipate calls for revision of financial software, such as fixed asset packages, Vohs maintained. Without such revisions, a company could wind up violating tax laws.

Since many DP departments began as, and remain, components of financial departments, the liberalization of tax laws may keep that old affiliation intact, Vohs suggested.

When commercial DP be-

gan during the economic boom of the 1950s, financial department functions were usually the first to be automated. In today's economy, abrupt changes in public policy have important consequences for systems planning. Many companies have established units in financial departments, which interpret these changes to systems personnel.

This trend seems especially strong among companies

whose business is government regulated. Pittsburgh, Pa.'s Mellon Bank, for example, has a staff of tax and legal experts that routinely advise systems managers on what legislation may do to their software, Vice-President David Moore said. These experts also counsel on how tax laws affect procurement issues, such as whether to purchase, lease or rent DP equipment.

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## With Communications Facility

## IBM Ties System/38 to Other CPUs

By Tom Henkel  
CW Staff

ATLANTA — In a move that industry analysts say is an attempt to make its System/38 more compatible with other IBM processors, IBM last week introduced System/38 Remote Job Entry Facility (Rjef) that allows the System/38 to communicate with 370, 30 series and 4300 processors.

The vendor simultaneously announced a feature to link multiple System/38 processors or to connect a System/38 with a System/34, communications support for several office automation products, a text management system and several data base management utilities.

The Rjef program product allows a

System/38 processor to operate as a multileaving remote job entry (MRJE) workstation using binary synchronous communications (BSC), IBM said. The software communicates with the host system over point-to-point (switched or non-switched) communications lines.

It interacts with the OS/VS1 Remote Entry Subsystem, OS/VS2 JES2 and JES3. The facility can also be used in a VM 370 Remote Spooling Communications Subsystem networking program product that allows the System/38 to function as a System/3 MRJE workstation.

The BSC attachment feature was designed to connect multiple System/38s with each other or with a Sys-

tem/34. Said to provide data transfer at a nominal line speed of 56K bit/sec, this feature allows high-speed data transfer between locally connected systems, a spokesman explained.

System/38 BSC support is offered for the vendor's 5520 Administrative System, Office System/6, 6670 information distributor, 6640 document printer, Displaywriter, Communicating Magnetic Card Typewriter and Communicating Magnetic Card Typewriter II, he said.

In addition, IBM introduced a text management package for DP documentation and internal correspondence. The software allows utilization of the System 38's data base for document creation, storage, retrieval, revision and printing.

## System Enhancements

Enhancements to System/38 Release 3 software allow the processor to function as a terminal to a 370, 30 series or 4300 processor using CICS/VS (Version 1.5.0) under OS/VS or DOS/VSE with Btam. This BSC program-to-program link connection can be either point-to-point (available in December) or multipoint tributary (available in June 1982), according to IBM.

The System/38 interactive data base utilities were also enhanced to improve the processor's data file utility and query feature by offering menu drives and prompts. These upgraded utilities are scheduled for December availability, according to IBM.

The Rjef program product costs \$135 and the text management program is priced at \$50/mo. Other enhancements do not affect pricing, IBM said.

## Maluta and Tittel Found Guilty Of Smuggling High-Tech Goods

By Christopher Simpson  
Special to CW

LOS ANGELES — Accused high-technology smugglers Anatole Maluta and Sabina Dorn Tittel have been found guilty in federal court here on a total of 21 counts of export law violations and tax evasion.

The two, along with co-defendants Werner Bruchhausen and Dietmar Ulrichshofer, were charged with operating an illegal export scheme that shipped at least \$8 million in high-technology goods to West Germany over a three-year period.

Much of the equipment was then transshipped to customers in Eastern Europe and the USSR [CW, Aug. 31]. It was "the largest in scope and most sophisticated in execution of any [illegal export scheme] known to date,"

according to Ted Wu, the assistant U.S. attorney who led the successful prosecution.

Bruchhausen and Ulrichshofer, co-defendants in this case, are presently fugitives in West Germany and have not yet been brought to trial.

## Appeal Planned

Maluta's attorney, Tony Capozzola, plans to appeal on the basis of what he argues were irregularities in the judge's handling of the case.

Tittel pleaded guilty to lesser charges and has given up her right to appeal.

The verdicts were handed down Oct. 25 and Oct. 27. Sentencing for both Maluta and Tittel is set for Nov. 23. Informed sources agree that jail sentences are likely.

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# HP Adds Software Family for Decision Support

By Tim Scannell  
CW Staff

PALO ALTO, Calif. — Turning its attention to the decision support aspect of information management, Hewlett-Packard Co. last week unveiled a series of software tools aimed at boosting the productivity of programmers and increasing the flexibility of nonprogrammers.

In the same breath, the firm also announced its fifth language option, Pascal, and an interactive enhancement of its RPG compiler.

The HP Rapid/3000 information management family consists of four individual but integrated packages: Dictionary/3000, Transact/3000, Inform/3000 and Report/3000.

Billed as the key structure to the whole software series, Dictionary/3000 is actually a data dictionary for all HP files, including the firm's Image data bases, Ksam and Multiprogramming Executive (MPE) sequential files. The software cross-files data items as they are entered, first by real-world relations that are meaningful to the user and then by across-the-board records and files, a spokesman explained.

Basically, the system allows information to be entered only once, but accessed from a variety of points and job perspectives. It effectively allows the user to create new data bases independently of the programs that will later use them, he said.

## Transaction Processing Support

Transact/3000 is aimed at transaction processing applications and consists of a high-level programming language, a compiler and an execute processor. The software works through Dictionary/3000 to interface with and link all HP 3000 data files.

As a programmer's tool, Transact/3000 consolidates most-used routines, ultimately improving the programmer's speed and reducing the time needed for program debugging and maintenance, HP claimed.

Report/3000, a report writer for programmers, can generate fully formatted reports from any HP 3000 data file, the spokesman noted. The package can draw from a user's Image/3000 data files, Ksam files or

from the sequential files controlled by the CPU's operating system.

Report/3000's major features include a set of formatting and control options, a subitem definition capability and a compiled statement language for report execution.

## Inform/3000 Generator

The final member of the Rapid/3000 family is Inform/3000, a report

generator geared for nonprogrammers. Drawing on the Dictionary/3000 software, the generator offers a variety of menus that help users select types of reports available and data items of related information on file. Using passwords, the user can browse through a file, call up particular points for processing, arranging or sorting, and deliver a copy to a CRT screen or remote printer, the

spokesman said.

HP's Pascal/3000 is an implementation of the firm's standard Pascal, introduced earlier for use on HP's 1000 series technical and Model 9825 desktop computers. It is also a super-set of the proposed Ansi standard Pascal, the spokesman pointed out.

Rounding out its software picture, HP enhanced its RPG compiler by in-

(Continued on Page 6)

# HP Extends the Range of Its 3000 Family

(Continued from Page 1)

structions per second (Mips) class, the system is still fully compatible with the more than 8,000 currently installed 16-bit-based members of HP's 3000 family.

The Series 64 has a hierarchical memory system with 8K bytes of high-speed cache memory and up to 8M bytes of main memory, expandable in 1M-byte increments. In addition, the system incorporates 64K-bit random-access memory (RAM) chips in its design, reportedly resulting in an effective memory access time of 145 nsec, an HP spokesman said.

The HP 3000 Series 64 can simultaneously support more than 100 terminals and workstation printers and is said to be more than twice as powerful as the less than year-old Series 44 computer.

A Series 64 system with 2M bytes of main memory, a system console, 12 terminal ports, a 120M-byte disk drive and a tape drive costs \$221,920. Additional memory is priced at \$16,000 per 1M byte.

## New Entry-Level Unit

The just-introduced HP 3000 Series 40 distributed office system, which replaces the Series 30 as the vendor's entry-level system, is about 2.5 times more powerful than its predecessor and reportedly outperforms the HP 3000 Series III — introduced in 1977 and up until about a year ago, HP's top 3000 series system.

The Series 40 offers up to 2M bytes of main memory and can support up to 56 point-to-point and multipoint on-line terminals. It can also handle up to eight HP disk drives, an inte-

grated cartridge tape drive, four magnetic tape drives, two line printers, two laser printers, a compact CRT terminal and three synchronous communications lines.

Series 30 users, as well as users of the Series 33, II, I and CX machines, can upgrade to the more powerful Series 40 system by exchanging processing units, the spokesman noted.

The Series 40 costs about 30% less than the Series 30. For example, a processor with 256K bytes of main memory, the firm's just-introduced 27M-byte disk drive with a built-in cartridge tape backup, a system console and four terminal ports, costs \$45,559.

A larger system, one with 512K bytes of memory, a 120M-byte disk drive, a tape drive, four terminal ports and a system console, costs \$79,449.

The Series 40 and 64 computers are available immediately with deliveries in about 20 weeks.

Although the maximum main memory on HP's Series 44 remains at

4M bytes, the firm is now using 64K-bit RAM chips in the memory's design and is packaging it on 1M-byte boards. Restructuring the Series 44's memory has allowed HP to lower its cost, a spokesman said.

## Cost Reductions

For instance, a 1M-byte system with a console, four terminal ports, a 120M-byte disk and a tape drive costs \$110,344. The system's former price was \$126,004, the spokesman noted.

Still focusing on the Series 44, HP announced that the computer's I/O and memory can now be expanded without purchasing additional processing unit expansion kits. This move reportedly reduces the cost and complexity of system enlargement.

The Series 44 is available now with deliveries in about 14 weeks, the spokesman said.

Additional information on HP's systems or peripherals can be obtained from the firm's Inquiries Manager, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

## HP Disk Drive Additions Include High-Capacity Unit

By Tim Scannell

CW Staff

PALO ALTO, Calif. — While computer systems stole center stage last week when Hewlett-Packard Co. made a variety of product announcements, a number of disk drives — including a high-capacity model — made their debut in the wings.

The high-capacity unit, the Model 7935 disk drive, provides 404M bytes of storage at a cost per 1M byte that is said to be 55% lower than previous HP storage devices. Now HP's largest capacity drive, the Model 7935 is priced at \$27,500 (plus a basic monthly maintenance charge of \$64), while other HP disks configured with similar storage capacities cost more than \$60,000, an HP spokesman noted.

The 7935 has a transfer rate of 1M byte/sec and an average access time of less than 35 msec. To perform routine maintenance functions, the unit has a keypad and alphanumeric display on its front panel that show internal diagnostics and allow immediate system access by the user.

The drive performs its own automatic head alignments, which further reduces the need for regularly scheduled preventive maintenance, the spokesman said.

Introduced at the same time as the Model 7935 were the 7908, 7911 and 7912 disk drives, which offer 16M-, 27M- and 64M bytes of Winchester

disk storage, respectively, as well as a cartridge tape drive for backup and user I/O. Each of the drives also has a microprocessor-based controller to handle most of the disk and tape operations without relying on the host computer for support, according to the vendor.

The HP 7908 has an average access time of less than 50 msec, while the 7911 and 7912 both have average access times of 35 msec. Designed to back up low- and medium-capacity disks, the tape cartridge backup transfers data up to 35K byte/sec, reportedly making it possible to copy the entire contents of a 404M-byte disk in less than 10 minutes.

All of the disks have diagnostic capabilities built into their controllers, including an internal verification test that occurs automatically at power on. The diagnostic package can isolate up to 95% of drive failures to the replaceable assembly level, automatically logging error information onto dedicated maintenance tracks, the spokesman pointed out.

A 16M-byte Model 7908 costs \$9,900, a 27M-byte 7911 costs \$12,500 and a 64M-byte 7912 is priced at \$15,000, with deliveries for all three set at about 12 weeks. The basic monthly maintenance charges on the 7908, 7911 and 7912 are \$46, \$43 and \$45, respectively. Deliveries on the 7935 are about 20 weeks.

## ISN'T IT ABOUT TIME THAT SOMEONE OFFERED A MANAGEMENT TOOL FOR MANAGERS?

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## Among Communications Announcements

# X.25, SNA Capabilities Released for HP 3000

By Bruce Hoard

CW Staff

PALO ALTO, Calif. — The 20-product deluge released by Hewlett-Packard Co. last week included five significant data communications offerings:

- An X.25 packet-switching interface option for all HP 3000 processors, as well as X.21 circuit-switching capability.
- Systems Network Architecture (SNA) compatibility for all HP 3000s.
- An Advanced Terminal Processor (ATP) for use with the newly introduced Series 64, the top-of-the-line HP 3000 processor.
- A fiber-optic multiplexer.
- A new version of the HP Intelligent Network Processor (INP).

HP also revealed its intention to implement a "shared media, local-area network standard" that will employ the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) line access method and baseband technology incorporated in Xerox Corp.'s Ethernet. Such a network will appear "probably over the next couple of years," according to an HP spokesman.

### X.25 Interface Option

The X.25 interface option for HP 3000 systems will allow them to com-

municate with other machines across the public packet-switched networks.

X.25 certification is underway for the Telenet network in the U.S. and Transpac in France. Certification for other networks such as Tymnet in the U.S. and Datapac in Canada is expected next year.

The vendor is providing X.21 capability for the following: European digital circuit-switched data networks; communications among 3000s; and remote job entry (RJE) communications from 3000s to IBM-compatible systems.

The X.25 and X.21 software, which are bundled together, is implement-

ed on the HP Intelligent Network Processor. Their software and one-time license fee is \$5,000.

The firm described the X.25 capability as a "first HP step" in its plans to "evolve its network architecture toward compatibility with the proposed Open Systems Interconnection [OSI] Reference Model." The OSI model is being developed by the International Standards Organization, whose goal is to develop a network architecture that interconnects all computer systems.

Along those lines, HP also began offering SNA support that allows HP 3000s to emulate IBM 3270 CRT terminals operating under SNA/Syn-

chronous Data Link Control (SDLC) in order to access IBM or IBM-compatible mainframes. HP did this by adding the Interactive Mainframe Facility (IMF) to its existing Distributed Systems Network (DSN) communications architecture.

DSN/IMP provides Physical Unit Type 1 capability. It emulates IBM 3271 Models 1 and 2 Binary Synchronous Communications (BSC); 3274 Model 1C/BSC and 3276 Models 1 and 2; and SDLC 3271 Models 11 and 12. An INP is required to implement the software.

Software and one-time license fee for the SNA compatibility package is

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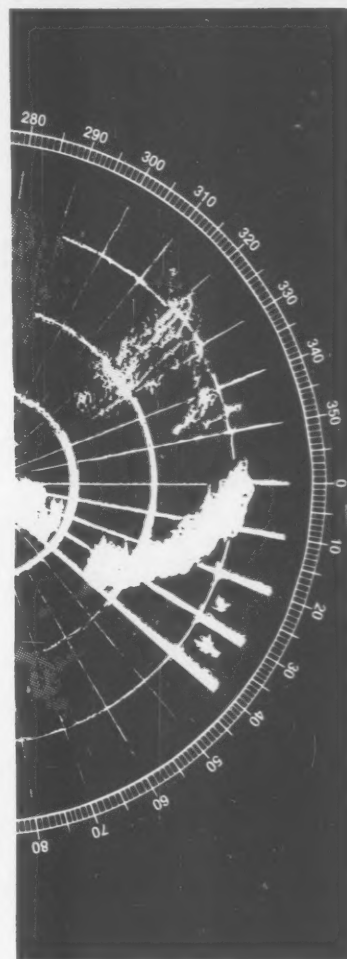
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## Three OA Tools Offered by HP

PALO ALTO, Calif. — Hewlett-Packard Co. last week reinforced its push into office automation by introducing two word processing software packages and an intelligent office-oriented workstation.

The first package, HPword, is reportedly a full-feature word processor that allows secretaries to create memos, letters and reports. Its features include automatic line recentering; editing by word, sentence or paragraph; and a menu-oriented display style, according to an HP spokesman.

The second software package, HPslate, is a text processing program that allows users to draft and revise documents and messages. The program's editing functions are accessed through screen-labeled function keys on the user's terminal.

The HP 2626W intelligent workstation was designed for use with both HPword and HPslate; in fact, many of HPword's software capabilities can be put into play through specially labeled keys on the terminal's keyboard. The terminal has 128K bytes of internal memory and, like other HP terminals, has a detachable typewriter-style keyboard and nonglare CRT screen.

When not used as a WP station, the terminal can be utilized as an intelligent data entry device, the spokesman noted.

HPword and HPslate cost \$5,000 and \$3,000, respectively. The monthly maintenance charge for HPword is \$95.

The 2626W intelligent terminal costs \$4,950. First deliveries are scheduled for December.



# BLS: DP Creating More Jobs Than It Displaces

(Continued from Page 1)

BLS noted that when computers were first introduced into office environments, "predictions were made that large numbers of clerical and kindred workers would be displaced and job opportunities for millions of people, in what is one of the largest occupational employment categories, would be curtailed."

The actual outcome was quite different. Clerical workers numbered about 10 million in 1960, about 15% of total U.S. employment. By 1980, according to BLS, there were more than 18 million clerical workers and they accounted for about 19% of the total work force.

Thus, instead of clerical worker employment decreasing, as had been predicted, employment increased about 85% between 1960 and 1980, according to the report, which also predicted "significant" clerical employment gains through 1990.

## Reason for Trend

This trend can be explained in part, BLS said, by normal growth in clerical jobs that offset jobs eliminated by computers. Also, the study said, "introduction of computers made possible work that was previously impractical because it would have been too costly and would have taken too long by precomputer technology."

"This is true," BLS said, "in everyday management functions, where it is now possible to prepare reports and analyses that previously were deemed desirable but too costly. Thus, the computer extended the scope of activities for many industries, creating employment opportunities."

BLS also noted the thousands of new jobs created in new occupations, such as systems analysts, programmers, keypunch operators and other computer-related occupations. Manufacturing of computers and related equipment also resulted in thousands of new jobs for workers in all

types of occupations — traditional and new.

BLS showed the growth effect of computers on nonmanufacturing industries by charting employment increases in several clerical-intensive sectors, between 1950 and 1980, including service industries — a 231.2% increase; government — up 168.3%; and the finance, insurance and real estate sector — up 173.4% in 30 years.

In comparison, manufacturing employment grew at a 33.6% rate over the period and wholesale and trade industries employment increased 119.2%.

## Outlook Positive

The outlook for the future effect of computers on employment is even more positive, BLS said, because service occupations and white collar categories, already heavily dependent on computers, will expand at the fastest rate in the economy. The white collar segment will see the largest gain in new jobs — 12 million to 16 million between 1978 and 1990.

Noting that clerical workers are the largest single white-collar occupa-

## How to Ease Impact on Worker

WASHINGTON, D.C. — Three specific measures can successfully "minimize the adverse effects to the worker" of new technology, according to the recent study from the Labor Department's Bureau of Labor Statistics (BLS).

- Advance notice to workers and unions allows individuals and their representatives to "formulate their own plans and to weigh carefully alternative jobs or layoff arrangements," BLS said. "Advance notice lessens anxiety and resistance to change" and can facilitate retraining programs.

- Coordinating labor adjustment with technical planning "increases the likelihood that attrition can be used to reduce the labor force, thereby avoiding the hardship of sudden layoffs and the loss of skilled and productive

employees."

Displacement can be minimized, BLS said, by controlling hiring of permanent employees and using temporary employees and overtime if labor requirements are projected far enough in advance. "Some companies time the introduction of new technology to a period of business expansion to cushion the impact."

- With computers and similarly complex equipment, retraining employees "is becoming more formal, continuous and costly, but essential to keep the workforce up to date and flexible," BLS said.

The study found "substantial" electronics and computer-related training in this country for new and existing workers by companies, labor unions and educational institutions.

tion category, BLS said, "this growth is expected even though computers, word processors and office technol-

ogies will continue to reduce unit labor requirements and change skill demands."

# HP Unveils X.25, SNA for HP 3000 Line

(Continued from Page 5)

\$7,000. Delivery is estimated at eight to 12 weeks.

The DSN/ATP is designed to interface asynchronous terminals to the HP 3000 Series 64 in a point-to-point configuration. The intelligent terminal controller transmits data up to 4,000 ft at speeds of 9,600 bit/sec through the RS-422 interface.

Used with the RS-232C interface, the ATP supports terminal speeds to 9,600 bit/sec with cables up to 15 meters or 50 ft long.

The ATP costs \$9,600 without modems, which cost \$1,530 each. Additional 12-port ATPs are \$6,480.

The HP 39301A is an eight-channel

fiber-optic multiplexer designed for 3000s. A pair of 39301As linked with 39200B fiber-optic cable allows interconnection of a remote cluster of up to eight RS-232C devices at distances to 1,000 meters or 3,280 ft. Each of the eight full-duplex channels can accommodate asynchronous data at rates up to 9,600 bit/sec.

The fiber-optic multiplexer costs \$2,350 and delivery time is 10 weeks. HP fiber-optic cable costs \$4.50 per meter.

## New INP Version

The new version of the INP is reportedly 11.6% lower in price than its predecessor and incorporates auto-

matic telephone dialing as a standard feature. It serves as the hardware interface between 3000s; between 3000s and multipoint terminals; and between 3000s and mainframe systems.

It supports BSC, full-duplex High-Level Data Link Control X.25 LAPB and IBM-compatible SDLC data link protocols. It also provides interfacing compatible with RS-232C, RS-422 and standards for U.S. and international autodial equipment.

It costs \$4,200 and takes 16 weeks for delivery.

# HP Adds Family Of Software

(Continued from Page 4)

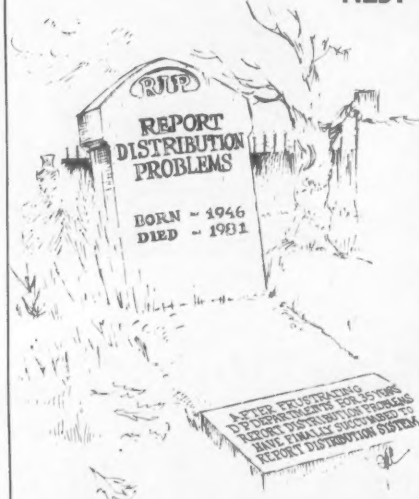
roducing RPG/3000. The revamped software includes a specialized editor dedicated to the execution and modification of RPG programs and provides a user-friendly interface to a program development environment. Using the software, programmers can edit source code as well as compile, prepare and run the program, the spokesman stated.

The Rapid/3000 group is available as either a single package or by individual units. Priced separately, Dictionary/3000 and Report/3000 cost \$5,000 each and Inform/3000 and Transact/3000 cost \$6,000 each. As a package consisting of the Dictionary, Report and Transact modules, the software costs \$13,000.

The Pascal/3000 software is priced at \$5,000. HP's RPG/3000 enhancement is available free to current RPG users and automatically included in the package for new users currently priced at \$3,000.

All of the Rapid/3000 software will be available for delivery this December, HP said from 1820 Embarcadero Road, Palo Alto, Calif. 94303.

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# PRC Urged to Make Decision Controversy Over Ecom Nears Boiling Point

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — The long-simmering controversy between the U.S. Postal Service (USPS) and the Postal Rate Commission (PRC) over the USPS' proposed electronic computer-originated mail (Ecom) service neared the boiling point last week.

In the latest development, the Department of Justice, plus others, advised the PRC to end its current reconsideration of whether the USPS should offer Ecom. Justice said the service can begin "only after a recommended decision by the Postal Rate Commission."

The USPS, however, has said the recommended decision already has been released, and this is one of the major points at issue. A related argument is whether USPS has purposely rigged Ecom to discourage participation by communications carriers. If the service then fails to fly, the postal service could demonstrate a need to take over the communications function itself.

## GAO: DP Audits Not Adequate

WASHINGTON, D.C. — Many federal agencies, while increasingly dependent on computer systems, have yet to provide adequate audit coverage of their DP operation, the General Accounting Office (GAO) reported recently.

In a just-released report, GAO said that although some of the 19 agencies it studied are effectively auditing their computer systems, there is generally only "limited compliance" with established DP auditing standards in many agencies.

The study found that "many organizations have not developed and maintained the skilled staff necessary to meet computer audit responsibilities for the agencies." Nine of the 19 agencies, which account for approximately 93% of all federal computer systems, did not even have adequate inventories of their systems, GAO said.

## Brown Ties Bell To Strong Economy

NEW YORK — It's as much in the national interest as in AT&T's not to break up the Bell system, AT&T Chairman Charles L. Brown said here recently.

Referring to the government's anti-trust suit against AT&T as a "charade" having "no relationship to the realities of the world outside," Brown tied preservation of the present Bell system to the U.S.' declining exports and stagnating economy. If it is not dismembered, the phone company will help reverse these trends by providing two essential ingredients — technology and managerial know-how, Brown maintained.

Brown said that "today, improving America's lagging productivity and reenergizing its innovative capacities are urgent national priorities."

The roots of the present Ecom controversy go back to 1979, when the PRC recommended an experimental service and said the postal service could offer telecommunications if there was a "demonstrated need." The governors of the postal service, however, wanted a permanent offering, so they took the PRC to court.

Last May, the court ruled the PRC lacked authority to specify an experimental service. But the court also remanded the "entire matter" back to the commission for reconsideration.

Those two words are at the root of the current controversy. USPS, insisting the "entire matter" considered by the court is whether the PRC

could legitimately recommend an experimental service, has thumbed its nose, in effect, at the commission's recent decision to reconsider what it refers to as the "entire matter" — the question of whether the postal service should be in the electronic mail business.

### What Next?

What happens next? Opponents of Ecom probably will take the postal service to court. But if the court appeal fails, USPS could end up, despite the best efforts of its opponents, providing the circuits to carry Ecom messages.

The final interface specifications

needed to link the transmission facilities of commercial carriers with the Ecom terminal equipment now being installed in participating post offices were released only recently, explained a knowledgeable source.

It will be impossible, according to this source, for the carriers to implement these specifications by Jan. 4, the scheduled start-up date for Ecom. Before making the capital investment required, they will want to see evidence that an adequate market is developing. But if the carriers don't interconnect quickly enough, USPS will be able to argue that a "demonstrated need" exists for the postal service to provide the circuits itself.

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MESSAGE	ID	UCB	LABEL	OPTION	PASS	FILE NO	RECORDS	LOCATION	LENGTH	RETRIES	ACTION	
FATS204	TAPE2	281	987654					1607 FT	4 IN	10	PERM DATA CHECK	
FATS204	TAPE2	281	987654					1607 FT	8 IN	10	PERM DATA CHECK	
FATS204	TAPE2	281	987654					1608 FT	13 IN	10	PERM DATA CHECK	
FATS204	TAPE2	281	987654					1608 FT	17 IN	10	PERM DATA CHECK	
FATS204	TAPE2	281	987654					1608 FT	21 IN	10	PERM DATA CHECK	
FATS204	TAPE2	281	987654					1609 FT	26 IN	10	PERM DATA CHECK	
FATS204	TAPE2	281	987654					1609 FT	30 IN	10	PERM DATA CHECK	
FATS204	TAPE2	281	987654					1609 FT	34 IN	10	PERM DATA CHECK	
FATS204	TAPE2	281	987654					1610 FT	39 IN	10	PERM DATA CHECK	
FATS204	TAPE2	281	987654					1610 FT	43 IN	10	PERM DATA CHECK	

The length of these bad spots would cause unrecoverable data checks and I/O errors during processing.

FAST ANALYSIS OF TAPE SURFACES DETAIL REPORT -- FATS VER 4.0 Z										INNOVATION DATA PROCESSING DATE 78-194		PAGE 0003
MESSAGE	ID	UCB	LABEL	OPTION	PASS	FILE NO	RECORDS	LOCATION	LENGTH	RETRIES	ACTION	
FATS107	TAPE1	280	123456					1 FT		01	LABEL WRITTEN	
FATS204	TAPE2	280	123456					1 FT		01	TEMP DATA CHECK	
FATS204	TAPE2	280	123456					1 FT		02	TEMP DATA CHECK	
FATS204	TAPE2	280	123456					1 FT			TEMP DATA CHECK	
FATS204	TAPE2	280	123456					2375 FT	6 IN	10	PERM DATA CHECK	
FATS204	TAPE2	280	123456					2375 FT	8 IN	10	PERM DATA CHECK	
FATS204	TAPE2	280	123456					2375 FT	13 IN	10	PERM DATA CHECK	
FATS204	TAPE2	280	123456					2377 FT			TAPE INDICATE *****	
FATS204	TAPE2	280	123456									
FATS204	TAPE2	280	123456									
FATS207	TAPE2	280	123456									
FATS301	END OF REPORT											

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# State Pours \$2.5 Million Into Outdated System

(Continued from Page 1)

tempt, the Boston-based accounting firm of Arthur Andersen and Co. spent nearly \$500,000 of state money to modify and install a \$50,000 software package, according to systems consultant Richard Newbert, who was commissioned last summer by New Hampshire Gov. Hugh J. Gallen to write the report. Today that modified Tracs software package, marketed by Tempo Computer Services of Etobicoke, Canada, is not supporting any of the SLC's hardware, and it represents an "extremely poor software choice," Newbert said.

Otis Gates, identified as Arthur Andersen's SLC project manager, declined to comment on anything related to the SLC matter.

## Recommendations Followed

Newbert said the state followed Andersen's recommendations when it:

- Purchased a Univac 90/40, a mainframe "which even then [1979] was something considerably less than state-of-the-art" and from which "Univac was known to be withdrawing support."
- Paid Andersen to develop and implement a general ledger system based around an IBM 29 punch card machine.
- Agreed to install the 90/40 in a building three miles distant from the SLC's data center, necessitating, among other things, that preprinted general ledger cards be keypunched and then transported physically to the 90/40 for batch input.
- Purchased about 70 Data Terminal Systems, Inc. Model 515 point-of-sale (POS) terminals, for which Andersen has failed to develop a workable interface with the Tracs software.

"The SLC now has to hand-type the 53-page quarterly wholesale price lists, which is really kind of ridiculous," Newbert said. "There is also no interface between any application

package and general ledger. It makes no sense."

Newbert said he was notified in August in a letter from Andersen that successful implementation of one-third of the system supported by Tracs would cost the state an additional \$150,000. Implementing the remaining two-thirds, including restart and recovery, the POS software interface and job control language (JCL) would have to be carried out by state personnel, he claimed he was told.

In his report, Newbert's primary recommendation is to scrap what the state has bought (or shunt it off on another state agency) and replace it with a new system "geared specifically to the wholesale and retail needs of the SLC." He estimated this would cost between \$1.2 million and \$1.5 million.

In all, Andersen collected more

than \$750,000 for system consulting, design and implementation, all of which was paid without there ever having been a signed contract between the state and the company.

The no-contract arrangement, which Atty. Thomas G. Cooper, Gov. Gallen's legal counsel, labeled "extraordinary and highly unusual," resulted from the special appropriations powers given to a select legislative committee formed in 1979 to rectify alleged mismanagement at the SLC.

## Obligations Hold

Cooper would not comment when asked whether the state would file a damage suit, but said the absence of a written contract "does not release either party from certain obligations in the delivery of and payment for a workable system." Cooper added that Andersen is no longer being

paid by the state even though the desired system is far from complete and characterized the relationship between the state and Andersen of late as "strained."

David J. Griffiths, the SLC's DP manager, said his shop is now running its distribution processing on the State Highway Department's Univac 90/80 on a leased-time basis.

"Not to knock Tracs, but it is simply not the right system for our environment," he said. "When you spend 10 times the package's purchase price to implement [Tracs], something is terribly wrong. To show you some of their [Andersen's] thinking, the shipping point is not even on the master file."

A meeting of the consultants and legislators on the matter was held last Friday at the statehouse, the results of which were not available at press time.

# Amdahl Returns Volley With New 580

(Continued from Page 1)

supplemented by an extra processing board, is said to be 70% more powerful than the firm's 5860 entry-level system. The firm did not have any figures available comparing the 5870's performance with its high-end 5880 processor. However, a spokeswoman did say that its power lies somewhere between the 5860, which is about twice as powerful as the 470V/8, and the 5880, which is internally rated as being 3.4 to 3.5 times as powerful as the 470V/8.

## 5870 Configurations

The 5870 system can be configured with up to 34 I/O channels and 32M bytes of main memory — twice the maximum offered on the 5860. However, the 5860 uniprocessor can be field-upgraded to the latest dual-CPU machine, and the 5870 can be upgraded to Amdahl's top-of-the-line 5880 computer.

The 5870 computer costs about 50% more than the 5860. For example, the price for a minimum system with 18 I/O channels and 16M bytes of main storage and including the first year's maintenance is \$5.4 million. The purchase price for a maximum configuration is about \$6.1 million, the vendor said.

The four-year U.S. lease prices for the 5870, excluding maintenance, are \$135,525/mo to \$153,425/mo. The two-year lease costs, also minus maintenance charges, range from \$169,400 to \$191,750, the spokeswoman explained.

Shipments for the 5870 are scheduled to begin the third quarter of 1983, more than a year after IBM plans to ship its initial 3081 Model Group K machine.

## IBM Architecture Support

Amdahl also announced that it will support IBM's System/370 Extended

Architecture, which consists of MVS/SP Version 2 and associated data management facilities and is collectively termed by IBM as MVS/XA. In addition, since Amdahl's 470V/7 and 470V/8 computer systems already incorporate a 31-bit architecture — which was recently announced with IBM's 3081 Model Group K and will be included in its Group D machine — these systems will also eventually support the extended functions of MVS/SP Version 2.

However, this latter move is subject to a detailed review of IBM's latest MVS/SP package, which will reportedly be available in the first quarter of 1983, the spokeswoman said.

Purchase prices for the 5860 and 5880 have been reduced 5%, dropping the cost of a typical 5860 from about \$3.8 million to \$3.6 million, and the price of a typical 5880 from about \$7.5 million to \$7.1 million. Both of these purchase prices include the first year's maintenance.

However, lease prices on both the 5860 and 5880 have been raised approximately 3%, the spokeswoman noted.

Purchase prices for typical 470V/7 and 470V/8 systems have also been cut by approximately 10%, and the prices of other 470 systems were decreased from 4% to 14%, she added.

Amdahl is located at 1250 E. Arques Ave., Sunnyvale, Calif. 94086.

# CBS Cable TV Plan Has Videotex Space

ALAMEDA, Calif. — One to three channels for videotex and four to five channels for wideband digital data transmission are included in a cable TV system CBS has proposed to build here.

Announcement of the proposal came shortly after the giant information conglomerate agreed with another giant, AT&T, to conduct a videotex trial in Ridgewood, N.J.

The Ridgewood test, scheduled to begin next fall, will involve 200 homes. It "isn't clear" whether AT&T will supply terminals and/or other support in Alameda if CBS wins the franchise there.

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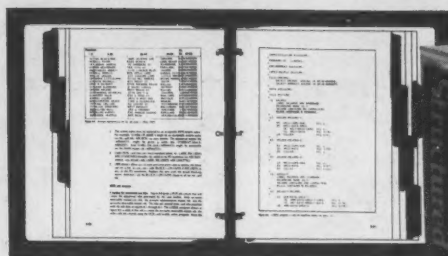
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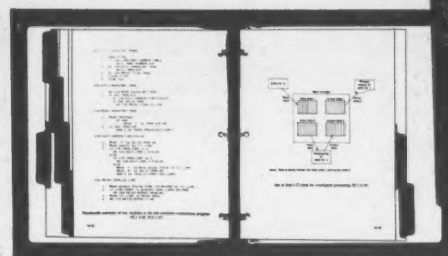
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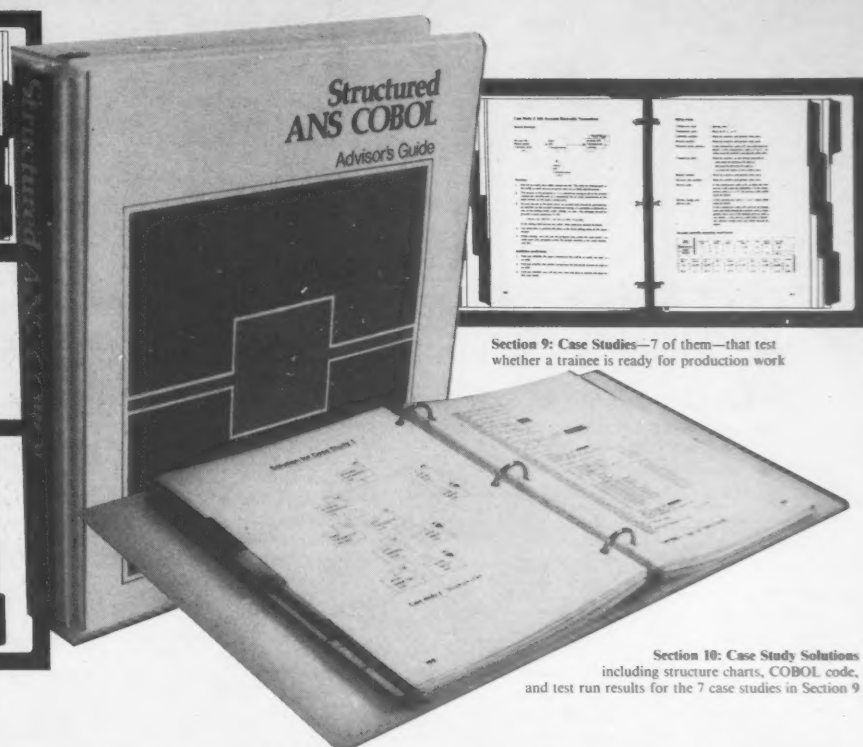
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## Exec: Tax Act May Swamp DP

(Continued from Page 1)

Mellon Bank may soon set up a "regulatory research and development group," Moore added. This group "would march us through our applications" to identify which software programs need code modifications as new laws and regulations descend on the financial institution.

In Paramus, N.J., Witco

Chemical Corp. is subject to regulations imposed by the federal Department of Energy (DOE), according to Eric Davies, director of management information systems. Mandates from DOE, "windfall profits" statutes and similar laws and regulations "are coming out of our ears," he complained, so the Economic Recovery Tax Act is just one more nuisance.

In a recent CW In-Depth article, Vohs warned the act, dubbed "Reagan's tax plan," will "probably force more revisions to asset management systems than to any other accounting systems" and "will bring a new perspective to the 'make or buy' decision facing many corporate DP managers" [CW, Oct. 12].

However, several corporate DP chiefs told CW that the tax law changes have yet to pose severe problems for their departments. They seemed unsure about the implications for systems planning.

At Del Monte Corp. in San Francisco, information services director Fenwick W. Holmes, called the tax law changes a "bonanza for software vendors," explaining that suppliers of asset management software may convince many users to buy such packages rather than attempt in-house revisions of existing applications.

The sudden need for new code "happens whenever the federal government rolls over in bed." But the Economic Recovery Tax Plan and analogous state-level legislation will not force "monumental" recoding at Del Monte, he predicted.

Although state tax laws usually resemble federal tax laws, not all states have produced something like the Reagan scheme, Holmes pointed out. Right now, this means that California and South Carolina users will need one set of financial software that conforms to the federal act and another set of software pegged to state law, Vohs indicated.

At W.R. Grace in New York, Vice-President Bob Herlihy said the Economic Recovery Tax Act may stimulate business generally, as hoped by the Reagan administration, but it would be "far-fetched" to assume the extra trade will drive up computing volumes at most companies.

Witco Chemical's Davies added that the investment tax credits featured by the act are insufficient reasons for users to step up procurement of DP equipment. The rapid pace at which technology advances can make systems ordered under long-term agreements obsolete by the time they are installed.

### Correction

A speaker at the recent Info 81 conference was incorrectly identified as Robert C. Gelb [CW, Oct. 19]. Dunn & Bradstreet Corp.'s Roberta C. Gelb gave advice on how to deal with top management in proposing a system development.

## Judges Decertify Patco For Illegal Strike

WASHINGTON, D.C. — The Professional Air Traffic Controllers Organization (Patco) lost its certification last week as the exclusive bargaining agent of the nation's air traffic controllers.

Patco's dissolution — stemming from wages, benefit and computer equipment-related strike begun last August [CW, Aug. 10] — came after a three-judge panel lifted an order that had temporarily blocked the 15,000-member union's decertification.

The Federal Labor Relations Authority, an independent agency created by Congress, stripped Patco of its union status 10 days ago. Within hours, the three-judge appellate panel intervened at the request of Patco and temporarily blocked that order.

### Illegal Strike Action

Last week the U.S. Court of Appeals for the District of Columbia said the union had not shown that the courts should further block the order dissolving Patco as a labor organization because of what it called its illegal strike action.

The order dissolving Patco took effect immediately. The Federal Aviation Administration can now go ahead and seek new contracts with working controllers and those controllers may begin forming a new union.

Patco plans to file an appeal within a few weeks, according to a union attorney.

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# Bill Would Curb Federal DP, Telecommunications

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Legislation to ensure that the federal government does not compete with private providers of telecommunications and information services has been introduced in the House of Representatives.

The bill, proposed Oct. 15 by Rep. Glenn English (D-Okla.), would prohibit any federal agency from providing such services to anyone other than another agency, except when there is no practical alternative or when the service is in the national interest. "The object is to ensure that the government does not stifle the development of innovative and competitive information services by private enterprise," English said.

English, whose Government Information and Individual Rights Subcommittee is investigating a range of federal information and telecommunications services, said "some government agencies seem to be usurping the role of private enterprise." Focusing on the U.S. Postal Service's proposed electronic mail service, English said the bill would allow the plan to proceed, but would forbid the post office to offer telecommunications services without prior congressional approval.

Because the post office claims to have no plans to offer transmission services on its own, English said, "this legislation should cause no undue hardship" to the Postal Service.

The bill provides a few exceptions to the general rule forbidding federal information services — specifically "where government is the only one capable of providing a service, where it is uneconomic or impractical for private enterprise and where the service is needed by the nation." According to English, such circumstances would be rare.

The bill would permit an agency to provide computer or communications services to people outside the government, he explained, when "Congress has approved the service and requires an agency to provide it; or, second, where Congress has granted a general authority which permits the agency to provide a service and the President, after determining the service is warranted, approves its provision through an executive order."

## GAO Says OMB Lax On Paperwork Act

WASHINGTON, D.C. — The Office of Management and Budget (OMB) has done little or nothing to implement the Paperwork Reduction Act, a law to streamline federal DP practices and reduce the public's government reporting requirements, congressional investigators said recently.

The OMB is charged with overseeing implementation of much of the law, but "progress has been slow and in many areas it has been nonexistent," the head of the General Accounting Office (GAO), Charles A. Bowsher, told an Oct. 21 hearing before the House Government Operations Subcommittee.

According to Bowsher, of 37 "key" OMB requirements under the 1980

law, only three are considered by GAO to have been completely fulfilled and only five others show any signs of progress.

Despite Subcommittee Chairman Rep. Jack Brooks' (D-Texas) conclusion that OMB has "apparently opted for a policy of 'minimal compliance' with the law," OMB representatives claimed the agency has made a respectable start in implementing the law. Deputy OMB Director Edwin L. Harper noted the agency's Office of Information and Regulatory Affairs, established to implement the act, has been in existence only six months.

## Washington Update

### FAA Told to Submit ATC Plan by Dec. 15

WASHINGTON, D.C. — The House of Representatives has passed a resolution directing the Federal Aviation Administration (FAA) to submit by Dec. 15 a preliminary system description of the future air traffic control (ATC) computer system.

The FAA has been working on a computer replacement plan for some time, but the House Science and Technology Committee is concerned about the pace of the project and is

demanding closer oversight of the multibillion-dollar system upgrade.

The resolution also directs the FAA to submit to Congress by June 15 a preliminary subsystem description for the computer system and a five-year cost projection.

In a recent report supporting the resolution, the Science and Technology Committee said "failure to complete the project successfully and on time could have severe consequences for safety in the nation's en route airspace." It also noted the FAA's record has not been consistently good in managing large system acquisitions and expressed a resolve to "review and analyze in depth" FAA decisions in this area "before authorizing large amounts of taxpayers' money."

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## Tymnet Asks Delay On DTS Applications

WASHINGTON, D.C. — Tymnet, Inc. wants the Federal Communications Commission (FCC) to delay acting on two applications for Digital Termination Service (DTS) networks until it has decided whether telephone carriers should be allowed to enter this new market.

Tymnet is one of nine companies currently seeking DTS licenses [CW, Oct. 26]. Its recent petition was directed at ISA Communications Services, Inc. — a prospective subsidiary of United Telecommunications, Inc. — and GTE Telenet Communications Corp. Each company has proposed establishing wideband, all-digital local distribution facilities in more than 40 cities.

In an order issued last April allocating frequencies for DTS service, the

FCC decided to defer consideration of the entry question until presented with an application from a monopoly telephone carrier. That has now happened, Tymnet said.

Tymnet suggested that, based on past rulings, the FCC is justified in either barring the telephone companies from offering DTS for a specified period or requiring them to provide the service only through separate subsidiaries.

## Western Union Gets Nod From House

WASHINGTON, D.C. — The House of Representatives Communications Subcommittee has unanimously endorsed a bill permitting Western

Union to offer international communications services.

Since similar legislation already has been approved by the Senate, final enactment is likely before the end of this Congress. However, there is a major difference between the House and Senate bills and it could delay the final vote.

H.R. 4801, the House measure, requires interconnection of Western Union's domestic network to the facilities of the U.S. international record carriers (IRC). The Senate bill, S. 271, makes interconnection dependent on further action by the Federal Communications Commission.

Most of the IRCs oppose the Senate bill and are not particularly happy with the House version. Basically,

they want Western Union barred from offering international services until interconnection has actually been established on acceptable terms.

## FCC OKs SBS, ASC To Service Canada

WASHINGTON, D.C. — Satellite Business Systems (SBS) and American Satellite Co. (ASC) have won permission from the Federal Communications Commission (FCC) to service terminal sites in Canada. For private-line users with installations in both the U.S. and Canada, the decision promises significant savings — satellite circuits can be used instead of land lines for telecommunications.

It will take "about six months" to implement the new scheme, according to an FCC spokesman. Canada must agree to it and the arrangement must be "coordinated" with the International Satellite Organization.

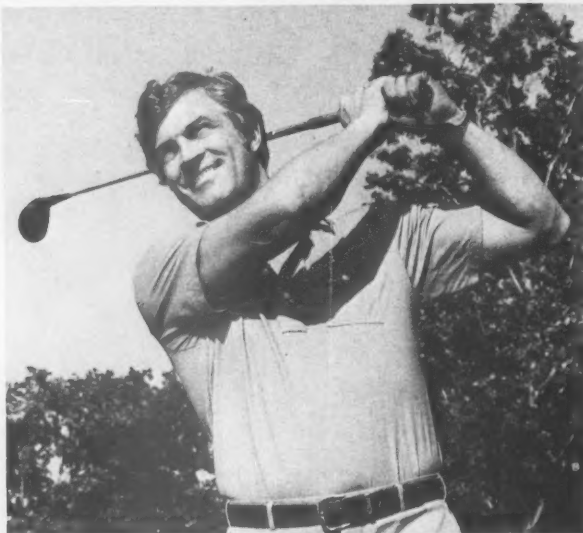
In addition, specific operating agreements must be signed by the U.S. and Canadian carriers.

## Users Eye Options In Rate Hike Fight

NEW YORK — Telecommunications users whose appeal of a 16.4% AT&T rate increase was recently turned down by the federal appeals court here began last week to consider their next step.

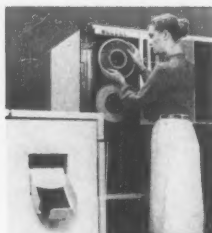
"Our options are to do nothing, seek rehearing by the appeals court or take our complaint to the U.S. Supreme Court," said a spokesman for the three broadcasting networks — ABC, NBC and CBS — that were among the appellants. The others included several large corporate telecommunications users.

The 16.4% private-line increase, which AT&T won from the Federal Communications Commission last May, was followed by a general rate increase. Together, they added an estimated \$2 billion/year to the communications bills of telecommunications users.



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## Doll Cites 'Hidden Procurements' of Micros

By Lois Paul  
CW Staff

NEW ORLEANS — The tremendous application backlog is forcing many end users to take matters into their own hands by purchasing microcomputers.

"In every one of the top Fortune companies there are hidden procurements of micros," Dr. Dixon Doll, president of the DMW Group, told McCormack and Dodge Corp.'s user group conference here last week.

Companies also are turning increasingly to packaged software, application generators and user-friendly languages that can be employed to access data from remote terminals.

It is important to gear management toward the emerging need for distributed data

processing networks and the direct involvement of users with data. Stressing the need for long-term planning regarding telecommunications, Doll said between 50% to 65% of transactions within companies involve local networks, yet there probably are not 1,000 Ethernets in the U.S. today.

"Even a 10% to 15% improvement in the productivity of white-collar workers can amount to literally billions," Doll said, yet the technology still is geared toward the clerical work force.

### Define Requirements

Companies need to lay out their existing requirements, he said, projecting these across the life cycle and anticipating modifications to be certain that their plan re-

flects the appropriate solutions.

He advised companies not to believe the unrealistic claims made by distributed DP salesmen. "Ask questions before, not after the installation process."

"You are never going to make it unless you have a strong set of management procedures to determine

what data end users can access," he said.

Doll noted that the computer industry is working frenetically on ways end users can avoid worrying about the physical network structures, the kinds of terminals being used and data structures. His prediction is that users in the future will not be able to tell the difference

between intelligent terminals and high-level microcomputers.

The real office of the future, according to Doll, is best viewed as a node in the electronic corporate network, which will include equipment ranging from personal computers to terminals to minicomputers, mainframes and facsimile machines.

## McCormack & Dodge Exec Hints At Support for Micro Software

By Lois Paul  
CW Staff

NEW ORLEANS — "It is our intention to let our customers take advantage of the powerful micro software that already exists."

This was the word John Landry, vice-president for research and development at McCormack & Dodge Corp., gave the company's users who met here last week.

Landry pointed to Personal Software Inc.'s Visicalc as an example. One of this package's drawbacks is that much information that could be used in modeling is locked in the mainframe computer, he said.

"Research and Development is currently designing the software for both mainframe and micro to allow data to be selected from either AFS [Advanced Financial Systems] Project central or distributed files and reformat for access and inclusion in Visicalc models," according to Landry. The AFS project is a current McCormack & Dodge undertaking involving microcomputer technology.

He said reverse software also is planned to provide the facility to export, for example, Visicalc budget models and reformat them into general ledger budget transactions. "We call this software synergy — integrating the use of widely disseminated micro software with the sophisticated data manipulation and storage capacity of the central mainframe."

### CP/M 'De Facto Standard'

Regarding software, Landry said: "Despite the fact that CP/M is not the most advanced of available operating systems for micros, it now has the distinction of becoming the de facto standard operating system for at least the low and personal processor." In addition, Basic, the most common language for micros, is becoming more standardized.

He added that Ryan McFarland (RM) Cobol is probably supported across more hardware and even operating sys-

tem environments than any other language. "Pending some further experimentation, RM Cobol will be the language of choice for our initial foray into micro-based distributed functions for the AFS project."

He pointed to Dbase II from the Ashton Tate Co. in California as a micro-based relational data base manager written in Assembly language. Another data base management system (DBMS) available for micros is the Codasyl-oriented MicroSeed or MDBS from International Data Base Systems, Inc.

For McCormack & Dodge's purposes, the initial design of potentially micro-based distributed application processing will require conventional Vsam-like file struc-

tures with flat records adaptable to relational DBMS processing, Landry said.

It will be necessary for files needed for processing to be available on the micro at the remote site. To achieve this, Landry said partitioning of the master general ledger file is required and the company will be using its Hilite information retrieval package for that purpose.

Touching on communications, Landry said the ideal is "to replace our dumb 3270s with micros, but to do this requires the ability to support bisynchronous 3270 protocol."

"We've had the opportunity to actually use the 3270 emulation package from Radio Shack Corp. that was introduced about a month ago," Landry noted.

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# For 41% of Users in Large Sites Micros Predicted Executive Staple in Five Years

By Lois Paul

CW Staff

NEW ORLEANS — Within five years, 41% of end users in large organizations will have or want their own computing power, that is — microcomputers.

This prediction from Input, Inc., a Palo Alto, Calif., research firm, was cited here last week by John Landry, vice-president for research and development at McCormack & Dodge Corp., during its user group meeting. "Computing will become distributed, like it or not . . . and from now on MIS [management informations services] management and software companies alike have to consider the extent to which they will implement distributed data processing systems," Landry said.

Describing the explosion of micros in the past few years, Landry pointed to the entries made by the giants of the hardware industry. "Tied into a communication network, the machines provide versatility now being touted not only by successful pioneers like Apple [Computer, Inc.] and Radio Shack, but increasingly by giants like IBM, Xerox [Corp.], Hewlett-Packard [Co.], Control Data [Corp.] and DEC [Digital Equipment Corp.]," he said.

Contending that micro magazines such as *Byte* and *Infoworld* should be required reading for financial and DP executives, Landry said, "It is the fundamental economy of microcomputer use that we believe will cause the long-awaited distributed processing revolution to occur."

Micros are changing the formerly accepted rules of computer price/performance, which hold that the cost per machine-instruction-executed is inversely proportional to instruction executed, Landry explained. Many application transactions in a general ledger system, for example, can run satisfactorily and cheaply on a small machine, Landry said, noting that 16-bit micros already are available and two 32-bit micros recently have been announced.

Ongoing usage costs also are lower for micros, he said, noting that their operating systems are less complex. Other advantages of the smaller machines include less maintenance and

the ability to easily replace the processor in the event of its failure, a requirement for less specialized staffing, easy installation and less rigid environmental demands, portability and an ease of upgrading in smaller increments.

## Vintage Year

Landry said that although 1975 is considered the birth year of the U.S. personal computer industry, it was in the summer of 1977 that the dramatic growth began with the introduction of Apple Computer, Inc.'s Apple II, Commodore Business Machines, Inc.'s Pet and Radio Shack Corp.'s TRS-30 Model I.

Between 1977 and 1980, the micro industry grew at an annual rate of more than 200% to a \$600 million market, he said. But it was in 1981 that "the big guns would target the micros . . . Almost concurrently, IBM, Xerox, HP and, most recently, DEC announced their personal computer offerings. But these were targeted not to the hobbyist or the home, but instead to small business and eventually large business personal processors."

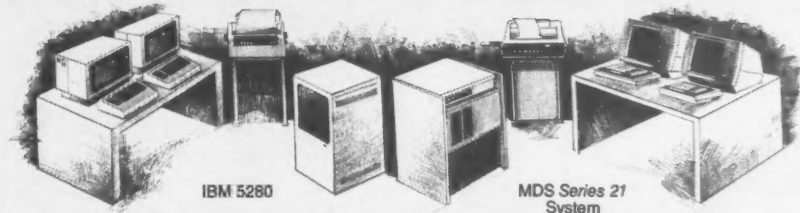
## Executive Target

He noted that IBM is using its 16-bit personal computer as "the pioneer executive workstation," a distributed

processing node to be used by managers and professionals either as a terminal or stand-alone system. Similarly, the Xerox 820 is being referred to by the vendor as a "desktop workstation" rather than as a personal computer. HP's new machine, the HP 125, is referred to in some ads as "the personal office computer."

Landry predicted that hard disk storage will become an active part of the micro software peripheral market within the next six months. Also, two companies two weeks ago announced what is being referred to as disk emulators or warp drives, which serve to increase data accessing speed.

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## Rising Prices, Special Charges

# Doll Sees Baby Bell Causing Major Adjustments

By Molly Upton

Special to CW

PHOENIX — Users will have to make some adjustments both now and after the birth of Baby Bell, Dr. Dixon Doll told attendees at the Enterprise Information Systems, Inc. forum here last week.

One of the major changes users will face when the fully separate subsidiary (FSS) comes into existence will be dealing with two different companies for their telecommunications needs,

according to Doll, president of the DMW Group, Inc. Bell will provide lines outside the building, but users will have to procure on-premise gear from the FSS.

In addition, Doll noted, users are already finding prices rising on nearly every type of line service as each type of service has to attain a specific rate of return.

Not only will all private lines be reclassified, there will be special charges for networking services, he said. Not least among price hikes

will be the rates charge for services such as installation testing, engineering consultation, expediting orders and overtime.

Bell will adopt a time and materials billing scheme similar to that of IBM, Doll warned. "It will be a shock to customers, who may take awhile to realize maintenance and support are not included in the basic price."

### Big Baby

When the FSS is born in 1983, it will come with some hefty assets — \$19 billion — and revenues of \$8 billion, which would rank it the 42nd largest industrial corporation in the U.S., Doll continued. There will be

some 130,000 employees; retraining and staffing has already begun.

Bell apparently is trying to outdo IBM in training its FSS marketing force. White shirts, now no longer the IBM uniform, are the style among the future FSS force. Doll commented that the assignment of executives for the FSS looks like the second wave of former IBMers is displacing the first wave.

One IBM attendee at the conference commented that the FSS was hiring some very talented IBMers. Doll indicated Bell is screening prospective FSS employees very carefully and running them through a battery of tests prior to training.

The FSS will inherit Bell's 1,500 retail stores and Doll speculated these stores could sell Tandy Corp. computers until about 1984, when it has its own products for sale. Bell might not call them home computers, but the product will certainly have the equivalent functionality, Doll indicated.

In line with its role of providing enhanced services, which includes anything with value added, including merely changing protocols, FSS will probably inherit Bell's Advanced Communications Service (ACS), which Bell will likely start offering in 1982 as a tariffed item, Doll stated.

Bell underestimated the original ACS that was to enable nearly any device to talk with any other, Doll said, but the "son of ACS" is now operational within Bell.

In addition to customer premise business equipment, the FSS will handle home phones, terminals and information services, he said. Another area belonging to FSS will be ATT International, as well as advanced mobile phone service.

Other likely FSS areas will include teleconferencing systems, both on a customer's premise and central locations currently offered; electronic mail and document storage; retrieval and transmission network services. Despite this list of product areas, FSS is not omnipotent and will face the problem of getting a service organization up and running, according to Doll.

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## Data Base Lets Users Scan For Jobs, Advertise Skills

MCLEAN, Va. — Source Telecomputing Corp. is offering a national data base of job listings to allow job hunters to scan for jobs or advertise their skills to prospective employers.

The firm is offering the service in conjunction with Computer Search International, which offers the CSI Career Network. The CSI Career Network is now part of The Source, Source Telecomputing's time-sharing network.

The CSI Career Network is supported by a team of recruiting firms in metropolitan centers throughout the U.S. The network lists about 40 job categories by location, necessary job experience, specific required skills and salary range. The data base can also be searched for keywords, CSI said.

Applicants can keep their resumes on file with any of the participating recruiting firms or input their resumes on a selective basis and send them to the recruiting firms via an electronic mail capability in the data base.

### Controlled Distribution

Resumes and job listings are identified only by a reference number and the recruiting firms hold the actual listings. The vendor claims the data base is confidential for both the company and the user, since both can control information distribution.

In addition, users can publicize their qualifications for corporate users of the data base, the vendor said.

The data base is accessed via The Source with a password and identification number supplied by CSI. The user needs a CRT terminal and a modem, according to a

vendor spokesman.

Access to the CSI Career Network costs \$2,400 a year, which covers data storage and transmission and also includes a subscription fee to The Source. There is an additional fee for using the communication facilities of the CSI network and The Source. Prime time usage (7 a.m. to 6 p.m., Monday through Friday) costs \$15/hour or 25 cent/min. Nonprime time costs \$4.25/hour or 7 cent/min. Computer Search International is located at 1500 Sulgrave Ave., Baltimore, Md. 21209. Source Telecomputing is located at 1616 Anderson Road, McLean, Va. 22102.

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# Why listen to just anyone talk about structured analysis when you can experience it with Tom DeMarco

## Workshop Objectives

The Structured Analysis and Systems Specification Workshop is a five-day course in YOURDON's Structure Techniques Series. This workshop teaches and demonstrates YOURDON's structured approach to systems analysis and building computer system specifications. The course focuses on critical problems that plague the early phases of a development project: specification failures, communication failures, and failures to adapt project directions to changing requirements.

The Structured Analysis and System Specification Workshop presents new tools and methods for the analyst. Its objective is to bring order and rigor to the specification process, to guide the analyst step-by-step in his development of a "Structured Specification" which has the following properties:

1. It is a graphic, made up mostly of diagrams.
2. It is partitioned, not a single monolithic specification at all, but rather a network of connected "mini-specifications."
3. It is top-down, presented in a hierarchical fashion with a smooth progression from the most general upper level to the most detailed bottom level.
4. It is concise. (The 5,000-page Victorian novel specification is out.)
5. It is iterative. Elements of the specification stand on their own; they can be shuttled quickly between analyst and user (dozens of times, if necessary) until they are right.
6. It is maintainable, a specification that can be updated to reflect change in the requirement.

## The Case Study Approach

The course is conducted as a pilot project in Structured Analysis techniques. Between the teaching sessions, participants analyse a significant case study system. They begin by building a

model of the current environment for a case study. In doing this, they gain experience and expertise in the use of the tools of Structured Analysis. They learn to approach model building as an exercise in functional decomposition and interface analysis.

The case study used in this course is adapted from an actual development project. Participants conduct portions of the analysis phase for the

project to be implemented. They build system models using Data Flow Diagrams, Data Dictionary, Structured English and non-linguistic process specification tools, and logical Data Structure Diagrams. They partition their own efforts along the lines suggested by the top-level

partitioning of the model, and work together as a true analysis team to develop the Structured Specification. They package the specification, conduct walkthroughs of it, and incorporate specification increments to test its maintainability. They review and criticize a structured specification sample of the case study system to test their comprehension of analysis goals and techniques.

## Topics

The specific course topics include the following subjects.

The Meaning of Structured Analysis. Conduct of Analysis. The Tools of Structured Analysis. Data Flow Diagrams. Levelled Data Flow Diagrams. The Analysis Phase Data Dictionary. Logical Data Structure. Process Description. Structured English. Non-Linguistic Specification. Model Transformations. packaging the Structured Specification. Memory State Transitions. Acceptance Test Derivation.

## Audience

This course is intended for systems analysts. It presumes an understanding of the classical approaches to specification and some familiarity with the user-analyst relationship and the development life cycle. It is an explicit "how to" course in preparation and negotiation of system specifications and in structured conduct of the analysis phase.

## About Tom DeMarco

Tom DeMarco is one of the recognized pioneers in the Structured Analysis Techniques. Tom DeMarco has had extensive experience in lecturing, writing, and consulting in systems analysis. He has lectured and addressed audiences in England, Europe, Australia, the Orient, and South America. His writing experience includes two books—*Concise Notes on Software Engineering* and the popular *Structured Analysis and System Specification*, both by Yourdon Press. In addition

to these, he is the author of numerous articles and essays on topics ranging from

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## NTSB Report Warns FAA Of Need to Reduce Stress In Air Controllers' Jobs

By Marguerite Zientara

CW Staff

WASHINGTON, D.C. — The National Transportation Safety Board (NTSB) "is concerned that the long-term effects of the current [air traffic controller] work schedules will lead to fatigue and stress, which may eventually degrade controller efficiency and aviation safety," according to a recent report.

The Federal Aviation Administration (FAA) should therefore implement a program to detect the onset of, and to alleviate, air traffic controller (ATC) fatigue and stress.

The study, begun Aug. 18 in response to the Professional Air Traffic Controllers Organization (Patco) strike of Aug. 3 [CW, Aug. 10], surveyed more than 41 air traffic facilities and included interviews with nearly 200 current controllers and supervisors.

An estimated 12,000 Patco members went out on strike to protest reportedly deficient ATC computer equipment, lack of adequate retirement benefits and to gain a shorter work week. Those who remained out were subsequently fired by President Ronald Reagan, who outlined a three-year plan to replenish the ranks with military and newly trained controllers.

### Added Stress?

A prime concern of the NTSB investigators was the possibility of added stress resulting from strike-related extended work hours and heavier work loads. While fatigue and stress currently are not problems, controllers reportedly are anxious that they may become problems in the future. "Most of these individuals [inter-

viewed] have stated that fatigue and stress have not emerged as significant problems," the study found. "These controllers have also stated that the general spirit of user cooperation, teamwork and a sense of job accomplishment has produced an emotional uplift which has offset the effects of extended work hours."

A three-year study of ATC stress levels in more than 400 controllers [CW, June 4, 1979] found that those who perceive their work environment negatively and who are dissatisfied with their work, co-workers or the FAA were more likely to develop psychological disorders or mild physical illness.

The study, conducted under the direction of Dr. Robert M. Rose at the Boston University School of Medicine, also found that dissatisfaction with FAA management policies was a "significant problem" believed to "represent part of the negative set associated with an increased risk for health change."

Rose's findings coincide with the NTSB's in that currently working controllers, who apparently feel no rancor or ill will toward the FAA, also apparently are experiencing no stress or other psychological afflictions.

"However, there was a pervasive feeling on their part that the uplift is likely to be short-term and that fatigue and stress might affect their performance in the future," according to the NTSB report. "Many of the controllers stated that the extended work week had disrupted their personal lives."

### Saturation Level

Indicating that since the end of August controller work load has increased "significantly," the NTSB study called current work loads "manageable," but noted they are "approaching levels where individuals and facilities are reaching the saturation level."

Specifically, the study cited the Denver air traffic control tower, where by Sept. 1 the daily traffic count had at times reached levels of about 94% of prestrike levels while the controller work force was at 60% of prestrike levels. In addition, the Atlanta Air Route Traffic Control Center "handled about 93% of prestrike operations during August 1981, with about 55% of the previous controller workforce," the study found.

Many controllers were found to be voluntarily increasing their work loads through additional services or by accepting control of general aviation aircraft. Such "helpful attitudes," however, can lead to additional work loads for controllers in adjoining sectors, as well as affecting national traffic flow control procedures, the study found.

"As a result, the good intentions of the controller work force may tend to reduce the effectiveness and safety of the flow control concept and to overtax the current ATC system," the report concluded.

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# For Training, Installation Support Unbundled Software Services Seen on Way

ATLANTA — Unbundled pricing of software product support services is on the way, according to a report entitled "Software Pricing Trends—1981," published by Culpepper and Associates, Inc. here.

Based on data obtained from 78 software vendors responding to its survey, the software management consulting firm found that 49% of all software vendors are charging separately for training clients. Installation support is separately priced by 35% of the vendors.

The percentages increase for larger vendors, those who have one or

more products exceeding \$5 million in annual sales, the report continued. Of this group, 71% reportedly charge separately for education and 42% have separate installation charges. The average fee for education is 11% of the license price, according to the study. It is said to vary considerably, according to price range and type of software.

The Culpepper survey also found that, "Free maintenance is a thing of the past. Over 87% of our respondents provide chargeable maintenance programs."

The report stated that the average maintenance price reported by all respondents was 11.4% of the license

price. This represents a sharp increase from the 6.9% average reported several years ago in a survey by another organization, according to the current surveyers. "The industry average will be 20% of the license fee by 1986," they projected.

## Other Findings

Also revealed by the survey were wide variances in billing rates for additional supports. "The average rates range from \$40 per hour for products priced under \$7,500, to \$72 per hour for products priced over \$150,000," they stated.

The report also found that price increases for 1981 are expected to aver-

age only 8.6%, compared with 16.2% annual increases during the 1977-1979 period. Price increases reportedly were strongest among vendors of application software for mainframes, with mini- and microcomputer software vendors showing price increases that dropped to 4.6%.

The survey also covered paid-up license prices vs. rentals, multicopy and multisite discounts, component pricing, discounts for IBM DOS users and discounts for multiple product purchases.

The report is available for \$150 from Culpepper and Associates, Inc. at 4922 Heatherdale Lane, Atlanta, Ga. 30360.

## Software Plans Topic of Seminar

MADISON, N.J. — A seminar designed to provide a system for delivering software projects that are cost-, organization- and user-effective will be presented in New York City and Rochester, N.Y., Jan. 6-8 and Jan. 13-15, respectively.

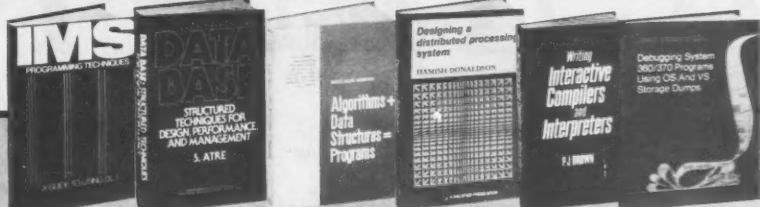
Sponsored by the American Institute for Professional Education (Aipe), "Software Project Management for EDP Professionals" focuses on all aspects of software project management from the role of the project management team to the development and delivery of the system.

In addition, topics to be covered include project administration, scheduling and estimating and relationships with the user and the team. Participants will also learn to troubleshoot existing project systems and ways to make the best use of outside suppliers, systems and software packages.

The registration fee for the three-day seminar is \$595, Aipe said from the Carnegie Building, Madison, N.J. 07940.

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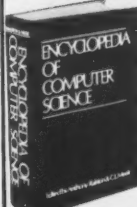
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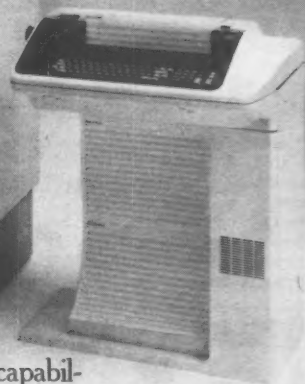
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CW-11-2-81

## More Than 200 Products Displayed

# China Trade Fair Draws U.S., Japanese Exhibits

By E.H. Kramer  
Special to CW

BEIJING, China — More than 200 U.S., Chinese and Japanese products from 80 computer research and production units were on display recently at a trade fair here.

"The products at last year's fair were like three-year-old children. But what I have seen this year are 17- or 18-year-old young men," a senior staff member of a U.S. computer company, a member of the U.S. delegation to the fair, commented.

The purpose of the three-week exhibit held in the Beijing Exhibition Hall in September and sponsored by the China State Administration of the Computer Industry was to introduce the public to the use of computers in the national economy and to promote their further application.

One of the reasons why China's computer industry has developed slowly over the past two decades is some authorities' beliefs that, because China has ample man-

power, the development of this industry is not desirable. The exhibition tried to convince people otherwise.

The first Chinese computer was made in 1958 and since then China has produced about 3,000 machines of various types. They are used primarily in education and scientific research. The State Administration of the Computer Industry was set up in 1979 in order to develop this new industry under unified leadership. Currently in China, there are 26 research institutes and 99 factories with 70,000 employees including 8,700 technicians. These units cooperate with colleges in carrying out research and production.

### Market Commodities

Computer technology has only recently begun to be applied in Chinese manufacturing production in addition to its scientific research applications. In 1979, computer products were changed from state-monopoly commodities to market commodities, and this has brought improvements in their quality, application and flexibility — and a reduction in prices.

In 1980, the China Computer Technology Service Corp. was established and branch offices were opened afterward, thus facilitating the application of computer technology in business.

On the exhibit floor, a Chinese character editing system of Chinese manufacture, though too large to be exhibited, drew particular attention from visitors. As Chinese characters are both numerous and complicated, a store of 2,500M bytes of char. may be required, causing difficulties that do not exist in Western languages. Scientists in the U.S., UK, Japan and other countries, as well as in Hong Kong and Taiwan, have been carrying out re-

search on editing Chinese characters by computer.

The Chinese character editing system was produced jointly by research workers in Beijing University and the Weifang Computer Factory in Shandong Province. The system has basically solved the problems of storage of condensed Chinese character messages, the editing of characters and laser printout, the last being a significant breakthrough. Also of interest at the exhibit were an information retrieval sys-

tem and a Chinese-medicine diagnostic system, both of which have utilized quite advanced computer technology.

The exhibition also demonstrated how computers can be used in many fields such as the administration of enterprises, the checking of textile machines, teaching, designing and bookkeeping.

Kramer, a member of the U.S. delegation to Beijing, is a principal in the Los Angeles CPA firm of E.H. Kramer & Co., specialists in computer applications.



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## Calendar

Dec. 1, Portland, Ore. — **A Legal Briefing for DP Professionals.** Contact: The American Institute for Professional Education, 100 Kings Road, Madison, N.J. 07940.

Dec. 1-2, New York — **Human Resources for Information Systems.** Contact: Joan Merrick, Datamation Conference Coordination Office, 850 Boylston St., Chestnut Hill, Mass. 02167.

Dec. 1-2, Boston — **Structured Documentation.** Contact: Carnegie Press, Center for Documentation Resources, 100 Kings Road, Madison, N.J. 07940.

Dec. 1-2, Philadelphia — **Computer Media Management Systems and Support Assessments.** Contact: Helen Torok, Stored Information Systems, 140 Cedar St., New York, N.Y. 10006.

Dec. 1-3, Washington, D.C. — **Executive Forum on Information Systems: Managing the Proliferation of New Technologies.** Contact: U.S. Professional Development Institute, 12611 Davan Drive, Silver Spring, Md. 20904.

Dec. 1-3, Washington, D.C. — **Designing Human Factors in Computer Graphics.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Dec. 1-3, Ottawa, Ont. — **International Information/Word Processing Association (IWP) Canadian Symposium.** Contact: IWP, 1015 N. York Road, Wilson Grove, Pa. 19090.

Dec. 1-3, London — **Software Info International.** Contact: Software Info International, Suite 400, 222 W. Adams St., Chicago, Ill. 60606.

Dec. 1-3, Washington, D.C. — **Financial Information Systems: The New Generation.** Contact: Department PR, NIMR Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Dec. 1-3, Washington, D.C. — **Financial Information Systems.** Contact: Department K, NIMR Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Dec. 1-3, Washington, D.C. — **Human Factor Issues in Computer Graphics.** Contact: George Washington University, Washington, D.C. 20052.

Dec. 1-3, Washington, D.C. — **Information Systems: Managing the Proliferation of New Technologies.** Contact: Information Systems, 12611 Davan Drive, Silver Spring, Md. 20904.

Dec. 1-4, St. Louis — **Cause '81.** Contact: D. Allan Eddy, Director, Systems and Administrative Services, Admissions and Records, Colorado State University, Fort Collins, Colo. 80523.

Dec. 1-4, Chicago — **Structured Systems Design.** Contact: Jim Highsmith, Ken Orr and Associates, Inc., 714 E. 8th, Topeka, Kan. 66607.

Dec. 1-4, New Orleans — **Computer Measurement Group XII Conference on Computer Performance Evaluation.** Contact: Computer Measurement Group XII Registration, Vijay Trehan, P.O. Box 26063, Phoenix, Ariz. 85068.

Dec. 2, Short Hills, N.J. — **Project Leadership Workshop.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20814.

Dec. 2-4, Arlington, Texas — **Data**

**Analysis.** Contact: Priscilla Goudreau, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Dec. 2-4, Raleigh, N.C. — **On-Line Systems Design.** Contact: Priscilla Goudreau, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Dec. 2, Washington, D.C. — **IBM's Master Plan for Networks.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Dec. 2, New York — **An Introduction to Pascal.** Contact: Jean B. Stables, Hoffmann-LaRoche, 340 Kings St., Nutley, N.Y. 07110.

Dec. 2-4, Chicago — **Implementing Computer Based Human Resource Systems.** Contact: MC Registrar, University of Chicago, Center for Continuing Education, 1307 E. 60th St., Chicago, Ill. 60637.

Dec. 2-4, Washington, D.C. — **Data Processing Seminars and Self-Study Programs.** Contact: Videodisc Learning Systems, Inc., 10522 Ridgeway Drive, Santa Ana, Calif. 92705.

Dec. 2-4, Orlando, Fla. — **Effective Data Systems Development.** Contact: Arnold Barnett, Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Dec. 2-4, Houston — **Office of the Future Today.** Contact: NIMR Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Dec. 2-4, Washington, D.C. — **P.L. 96-511 and Beyond: Improving ADP Management Under the Paperwork Reduction Act.** Contact: P.L. 96-511 & Beyond, 12611 Davan Drive, Silver Spring, Md. 20904.

Dec. 2-4, Phoenix — **Computer Auditing, Security and Controls.** Contact: Jim Christensen, Information Systems Institute, 3341 W. Peoria Ave., Phoenix, Ariz. 85029.

Dec. 2-4, San Francisco — **Improving Automated Payroll Systems.** Contact: AMA Headquarters, 135 W. 50th St., New York, N.Y. 10020.

Dec. 3, Kansas City, Mo. — **How to Develop a Long Range DP Plan.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20814.

Dec. 3, Palo Alto, Calif. — **California Computer Show.** Contact: Carol Reimer or Norm De Nardi Enterprises, 289 S. San Antonio Road, Los Altos, Calif. 94022.

Dec. 3, New York — **Microcomputer Systems and Business.** Contact: Jean Stables, Hoffmann-LaRoche, 340 Kingsland St., Nutley, N.J. 07110.

Dec. 3-4, St. Louis — **Computer Graphics: Microprocessor/Personal Computer Systems.** Contact: Martha K. Fort, Arts & Sciences Continuing Education, 103A Humanities-Social Sciences Building, University of Missouri, Rolla, Mo. 65401.

Dec. 3-4, San Diego — **Software: A Legal Briefing for EDP Professionals.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Dec. 3-4, Washington, D.C. — **Electronic Mail: Technologies and Policy Issues.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Dec. 6-9, Boston — **Data Training '81.** Contact: North East Training

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## Calendar

News, 176 Federal St., Boston, Mass. 02110.

Dec. 7, Tulsa, Okla. — **Stradis**. Contact: George Blatt, Department K277, Box 516, St. Louis, Mo. 63166.

Dec. 7, Denver — **Software Decision Symposium**. Contact: Vaughan Merlyn, Merlyn Corp., 6075 Roswell Road, Atlanta, Ga. 30328.

Dec. 7-8, Orlando, Fla. **How to Manage Data and Information as a Resource**. Contact: Arnold Barnett, Barnett Data Systems, 10 Orchard Way N., Rockville, Md. 20854.

Dec. 7-8, New Brunswick, N.J. — **User Documentation**. Contact: American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Dec. 7-8, Washington, D.C. — **Software: A Legal Briefing For DP Professionals**. Contact: The American Institute for Professional Education, 100 Kings Road, Madison, N.J. 07940.

Dec. 7-8, Framingham, Mass. — **Data Communications**. Contact: Continuing Professional Education, Worcester Polytechnic Institute, Worcester, Mass. 01609.

Dec. 7-9, Denver — **Effective Data Base Management**. Contact: Datapro Research Corp., 180 Underwood Blvd., Delran, N.J. 08075.

Dec. 7-9, Los Angeles — **Automating and Integrating Office Systems: Tools and Implementation Strategies**. Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Dec. 7-9, Raleigh, N.C. — **Computer Control and Audit**. Contact: Priscilla Goudreault, Q.E.D. Plaza, Wellesley, Mass. 02181.

Dec. 7-9, Philadelphia — **EDP Quality Assurance**. Contact: Priscilla Goudreault, Q.E.D. Plaza, Wellesley, Mass. 02181.

Dec. 7-9, Caracas, Venezuela — **Fundamentals of Data Communications**. Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Dec. 7-9, Washington, D.C. — **National Conference on Computer Graphics: Tools for Productivity**. Contact: U.S. Professional Development Institute, 12611 Davan Drive, Silver Spring, Md. 20904.

Dec. 7-11, Wellesley, Mass. — **Systems Analysis Workshop**. Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Dec. 7-11, Teaneck, N.J. — **CICS Command Level Programming**. Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Dec. 7-11, Kansas City, Mo. — **Structured System Design/Structured Program Design**. Contact: Jim Highsmith, Ken Orr and Associates, Inc., 714 E. 8th, Topeka, Kan. 66607.

Dec. 7-11, New York — **Structured Analysis & Systems Specification Workshop**. Contact: Anthony Formica, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Dec. 7-11, New York — **Systems Analysis Workshop**. Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20814.

Dec. 7-11, Denver — **Systems Analysis Workshop**. Contact: BSI, 4720 Montgomery Lane, Bethesda, Md.

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Dec. 7-11, San Diego — **Tutorial Week West**. Contact: IEEE Computer Society, P.O. Box 80452, Worldway Postal Center, Los Angeles, Calif. 90080.

Dec. 7-11, Waltham, Mass. — **Microprocessor Seminar**. Contact: David Chadbourne, GTE Sylvia Tech, 95 Second Ave., Waltham, Mass. 02254.

Dec. 7-11, Los Angeles — **The Information Engineering Revolution**. Contact: Information Methods (USA) Corp., Suite 1451, 10 Milk St., Boston, Mass. 02108.

Dec. 8, New York — **Microcomputer Systems and Business**. Contact: Jean Stables, Hoffmann-LaRoche, 340 Kingsland St., Nutley, N.J. 07110.

Dec. 8-9, Washington, D.C. — **Electronic Systems for Trade and Transportation**. Contact: Edward A. Guilbert, Transportation Data Coordinating Committee, 1101 17th St., N.W., Washington, D.C. 20036.

Dec. 8-9, Cranford, N.J. — **Computer Media Management Software Systems and Support Assessments**. Contact: Helen Torok, Stored Information Systems, 140 Cedar St., New York, N.Y. 10006.

Dec. 8-9, Waltham, Mass. — **How to Audit and Control Computer Systems**. Contact: NHC Resource Center, New Hampshire College, 2500 N. River Road, Manchester, N.H. 03104.

Dec. 8-9, Dallas — **Structured Documentation**. Contact: Carnegie Press, Center for Documentation Resources, 100 Kings Road, Madison, N.J. 07940.

Dec. 8-10, Topeka, Kansas — **Structured Program Design for Teleprocessing**. Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607.

Dec. 8-10, London — **Fifth International On-line Information Meeting**. Contact: The Anderson House, Strokes Road, Medford, N.J. 08055.

Dec. 8-11, Wellesley, Mass. — **Human Relations: Productive Working Relationships**. Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Dec. 8-11, Boston — **Ada**. Contact: Intermetrics, Inc., 733 Concord Ave., Cambridge, Mass. 02138.

Dec. 9, Los Angeles — **Software Decision Symposium**. Contact: Merlyn Corp., 6075 Roswell Road, Atlanta, Ga. 30328.

Dec. 8-11, Philadelphia — **Structured Requirements Definition**. Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607.

Dec. 9, Los Angeles — **Practical Project Management Workshop**. Contact: Augur Data Planning, Inc., 1401 W. Broadway, P.O. Box 34185, Vancouver, B.C., V6J 4N1.

Dec. 9-11, Los Angeles — **DP for Accountants and Financial Executives**. Contact: Herb Stern, American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Dec. 9-11, New York — **Long-Range Information Systems Planning**. Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020. Also being held in San Francisco Feb. 8-10.

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## Based on Same Operating System

# Ultimate A1 a 'Twin' to Reality System 4000

By Hillel Segal  
Special to CW

The second virtual memory system tested in this series of reports, the Ultimate A1, can almost be looked on as a "twin brother" to the Microdata Reality System 4000 reported on earlier in *Computerworld*. Based on the same operating system developed by Pick Computer Works, Inc., these systems appear almost identical to the end user.

One of the most expensive systems in this series of reports, the Ultimate A1 was also an excellent performer in the order entry benchmark tests. Users contacted were generally pleased with the system software, especially the data retrieval language, but were less enthusiastic about system reliability and service and support.

The Ultimate A1 is the 11th system in the \$25,000 to \$50,000 range the Association of Computer Users (ACU) has reported on for CW. ACU's independent consultants used for their tests an Ultimate A1 consisting of a 4303 CPU with 128K bytes of error-correcting memory, an 80M-byte fixed/16M-byte removable disk drive, a 150 line/min Printronix printer and an Ultimate CRT terminal.

Total system price, including optional I/O ports and system software, is \$51,350. Additional terminals are available for \$1,250 each.

The A1's order entry response times were very impressive (see Scorebox). However, the times shown reflect six order entry terminals in use rather than eight, due to output port limits in the system.

As with the 4000, the data base orientation of the A1 was reflected in the CPU-intensive timings, which were relatively slow.

### Pick Operating System

The Ultimate A1, like the Microdata Reality 4000, is based on a virtual memory operating system developed by Pick Computer Works. Although the operating systems are implemented differently, they appear similar to the enduser.

In fact, if a user were to sit down in front of a "generic" terminal, it would be almost impossible to tell the difference.

The Microdata system is based on Microdata's own hardware; the A1 is based on Honeywell, Inc. computing

## SCOREBOX

System: Ultimate A1

Current Price: \$48,850 with one terminal  
\$58,850 with seven terminals

### OTHER BENCHMARK RESULTS Test E-4

	CPU-Intensive Time	Order Entry Time
Wang 2200MVP	16.4 Sec	4.6 Sec
IBM Series/1	*	*
TI DS990 Model 4	135.2 Sec**	4.3 Sec**
Hewlett-Packard 250	***	***
DEC Datasystem 355	84.1 Sec	16.1 Sec
Microdata 4000	239.7 Sec	3.4 Sec
Alpha Micro AM-100T	45.2 Sec	5.7 Sec
Data General CS/50	112.4 Sec	9.8 Sec
Altos ACS8000-10	473.1 Sec****	6.8 Sec****
Burroughs B91	10.2 Sec*****	3.2 Sec
Ultimate A1	135.3 Sec	1.9 Sec*****

\* Programs could not be run properly due to a loss of characters in the order entry processing.

\*\* For programs run in Cobol; the respective times for Pascal are 68.1 sec and 3.9 sec.

\*\*\* The 8-terminal test could not be run, as a maximum of 5 terminals can be connected. With 4 terminals, times were 47.6 sec for the CPU test and 2.3 sec for the order entry test.

\*\*\*\* Tested with only two order entry terminals due to 4-port limit.

\*\*\*\*\* Tested using Burroughs' remote terminal emulator.

\*\*\*\*\* Maximum system configuration is 7 terminals and the printer. Times shown for the tests are with 6 terminals connected.

hardware. Ultimate adds its own implementation of the Pick operating system and a variety of terminals and

word that is not in the central memory, a page fault results. The system must then wait for the disk to read in

**This is the 40th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.**

printers.

The operating system employs virtual memory, reading in sections of memory from the disk as needed by the user program. Although a virtual memory system makes efficient use of all available memory, a good deal of operating system overhead is required.

When the program addresses a

the addressed word before continuing. As the number of page faults increases, the system must spend more and more time waiting for the disk I/O to complete.

The very fast order entry times obtained for this report are due in part to the fact that our application was not experiencing any page faults. The program, which was shared by all terminals, was probably resident in memory for the entire testing period.

This was shown by the fact that when our host "pulled the plug" on the disk drive, the program continued to run.

### Individual Frames

The virtual memory technique employed divides each program or data file into 512M-byte frames. One frame at a time is then read in to main memory and executed. When a location not presently in the main memory is addressed, the system reads a new frame into the memory and resumes program execution.

The files are organized so that files at one level point to multiple files at a lower level. This hierarchical file

structure took a little getting used to, but with use was easy to understand.

The Release 10 operating system includes a wide variety of data base management software, utility programs and an Assembly language. The Terminal Control language provides the primary interface between the user and the system. The various utilities, processors and programs are invoked by entering simple commands called verbs.

The languages supplied include a data retrieval/report generator called Recall and an enhanced version of the standard Dartmouth Basic.

The compiled Ultimate/Basic combines some of Basic's best features (variable length string variables, multiple statements on a line and so on) with those of Fortran (external subroutine calls, Common variable storage and so on). Ultimate/Basic should be a fun language to program.

### Valuable Feature

One feature scored high by users was the Recall data retrieval language. This query language, with its "English-like" syntax with nouns, verbs and modifiers, can be easily learned by the noncomputer-oriented business manager.

Using Recall, the manager can query the data base in a variety of ways using searches, sorts and so forth on any number of fields. Typical user comments included: "Recall is great. It helps ease the day-to-day data searches we need to make."

Another excellent feature is the Proc processor. By using Proc, a complex series of operations can be stored and invoked later by entering a single word command. With features like argument passing, terminal prompting and branching, Proc provides a powerful (though somewhat complex) tool for the user. More simplification would greatly enhance Proc.

### 'Mixed Bag'

Of the 11 users contacted for our survey, hardware reliability and service was a "mixed bag." Most service calls and downtime were caused by peripherals and about half were happy with Honeywell's service.

Because the hardware is supported by Honeywell, the operating system by Ultimate, and the peripherals by other vendors, coordination problems can be expected. As Ultimate becomes a larger factor in Honeywell's sales, these coordination problems should decline.

This is our second look at a Pick-based system. We are impressed particularly by the data base orientation and the Recall data selection/report generation utility. For business data base-oriented applications, the Ultimate is a serious contender.

Hillel Segal is president of the Association of Computer Users, a nonprofit association with members in the U.S., Canada and several other foreign countries. A package of information about the Association of Computer Users is available from the group at P.O. Box 9003, Boulder, Colo. 80301.



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# JPL Scientists Tell Why Commercial Value Seen in Space Discoveries

By Robert Batt

CW West Coast Bureau

PASADENA, Calif. — Why should information managers be interested in the discovery of outermost space? For plenty of reasons, according to scientists here at the National Aeronautic and Space Administration's (Nasa) Jet Propulsion Laboratory (JPL).

The scientists, whose ranks include some of the world's foremost thinkers in mathematics and physics, believe that the technology used in space today will have applications on earth tomorrow. "Take, for example, some of the earliest work we did in the 1960s," Dr. Phil Roberts, technical staff member at JPL's Advance Mission Planning section, said. "The pioneering work we did then with computers is now enabling us to figure out what to do with the space near earth — as witnessed by the growing use of communication satellites for business purposes," he explained.

He added that the technology now being applied in missions such as the *Voyager 2* unmanned space probe to Saturn will have commercial applications in the years ahead.

"Overcoming spacecraft design problems by computer often has frequent commercial implications," he

## Forth Helps Find Hole in Universe

HERMOSA BEACH, Calif. — The recent discovery of an immense hole in the universe measuring 300 million light years in diameter has been credited in part to the Forth programming language.

Reporting on a two-year study in the current issue of *Astrophysical Journal Letters*, Garry Mechler of the Kitt Peak National Observatory in Arizona said the discovery of the huge void could revise theories of how the universe evolved.

A Forth-based data acquisition

unit called an Intensified Image Director Scanner transfers telescopic images onto computer tape that is then used to chart the position of stars in the galaxy.

Forth was adopted in 1976 by the International Astronomical Union. Prior to the recent study, carried out by the Kitt Peak Observatory in conjunction with Mount Hopkins Observatory, astronomers had never noticed the void because galaxies in front and behind it had only allowed a two-dimensional view.

explained. As unmanned spacecraft delve deeper and deeper into space, for example, each spaceship will need more and more computing power on board. "At the moment, few contingencies are planned except for fail-safe modes. As the distances explored increase, so does the communication time with earth, so there is going to be a need for more control on board the craft itself."

This, he claimed, is pushing space technology into areas such as distributed data processing, robotics (sensor vision techniques) and feedback

instruments that would have benefits on earth.

One way in which computers are used at JPL is for estimating the precise measurements of one planet's position relative to another at any particular time. According to Roberts, the process of estimating how well we know things and continually refining the findings has applications in the manufacturing world such as material planning.

Computer graphics and image processing are other big areas of application at JPL. Computers are used to

analyze scientific data photographed and brought back to earth and to reconstruct the image to reveal data not able to be seen by the naked eye.

Such information has allowed scientists to continually discover facts about the universe. For example, until recently, gravity was thought to be the only major force in astronomy, Roberts said, but as a result of computer-generated photographs of Saturn's rings, this theory is now being questioned. For the first time, electromagnetic fields, formerly thought unimportant, are being seriously considered.

## Computers in Space

Trajectory measurements, spacecraft navigation and error correction are other uses for computers in space. Among the missions currently being planned by Nasa for which these applications are needed is a mission to Jupiter to sample the planet's atmosphere. More ambitious still is a mission known as Venus Orbiting Image Radar. The idea is to illuminate the surface of Venus with radar beamed from a spacecraft.

In this way it is hoped to discover details about the surface of Venus, which at a distance of between 25 million and 150 million miles away from Earth has never been seen.

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## Seminars Planned on Network Protocols

MADISON, N.J. — A series of three-day seminars devoted to network protocols are being offered in six major cit-

ies by the American Institute for Professional Education.

The seminars will be held in Portland, Ore., Nov. 4-6;

Boston, Nov. 11-13; Philadelphia, Nov. 18-20; Phoenix, Dec. 2-4; Houston, Dec. 9-11; and Baltimore, Dec. 16-18. The seminars are intended for analysts, designers, programmers and managers with data communications responsibilities.

Registration for each three-day event costs \$595. Complete details can be obtained from the Institute at the Carnegie Building, Madison, N.J. 07940.

## TTI Course on Ethernet Scheduled for Nov. 9-11

WASHINGTON, D.C. — A three-day course on local data networks focusing on the Ethernet network will be held here Nov. 9-11 by the Technology Transfer Institute (TTI).

Course leaders John Shoch, Don Weir and Larry Roberts will present an analysis of the Ethernet, user requirements, private branch exchanges, local area network

alternatives, system performance and economics of the various approaches.

The seminar was designed for technical managers, data communications planners, information resource managers and others responsible for wiring offices, according to TTI.

The registration fee is \$695, TTI said from 741 10th St., Santa Monica, Calif. 90402.

## Information Systems Focus of Yankee Group

CAMBRIDGE, Mass. — The impact of communications on the next generation of information systems products is the focus of "Advanced Strategies: The First Annual Yankee Group Briefing Session," to be held in New York City Dec. 1-2 and Palo Alto, Calif., Dec. 8-9.

The seminar will delineate new product opportunities catalyzed by the integration of information systems communications. The Yankee Group will analyze where the market is, where it is going and how the technology will be exercised by key

firms.

The seminar costs \$725, the firm said from Harvard Square, P.O. Box 43, Cambridge, Mass. 02138.

## Communications Topic of Courses Set for November

OAK BROOK, Ill. — Two courses on data communications will be held here Nov. 19 and 20 by the Business Communications Review (BCR).

"Introduction to Data Communications" was designed for voice telecommunications personnel and others with a minimum amount of data communications experience. "Computer Networks for Tomorrow — Long Distance and Local Area" was designed for telecommunications professionals with some background in data communications. It will give insight into the structure and issues involved in networks.

Both courses cost \$425, BCR said from 950 York Road, Hinsdale, Ill. 60521.

## Gross Named IIA President

ALTAMONTE SPRINGS, Fla. — The Institute of Internal Auditors, Inc. (IIA) has announced the selection of Stanley C. Gross to serve as permanent president of the 24,000-member organization.

Gross, who has served as interim president since January, is a certified internal auditor and a past international president of the IIA. He is a retired corporate director of internal auditing for the Sherwin-Williams Co. in Cleveland.

A member of the IIA since 1955, Gross has served in volunteer leadership positions as president of the IIA's Cleveland chapter, as the IIA's Great Lakes regional vice-president and as a member of the IIA's international education, admissions and membership committees.



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## J. Presper Eckert Jr.: Success at an Early Age

"What puzzles me most is that there wasn't anything in the Eniac in the way of components that wasn't available 10 and possibly 15 years before... The Eniac could have been invented 10 or 15 years earlier and the real question is, why wasn't it done sooner?"

— J. Presper Eckert Jr. (1962)

If Eniac, the first large-scale general-purpose, electronic digital computer, had been invented 15 years earlier, co-inventor Eckert would have been all of 11 years old. As it was, he was only 26 when the machine began to whirl and hum.

Born April 9, 1919, the only child of prosperous Philadelphia parents, Eckert had a stimulating childhood peopled with such figures as Douglas Fairbanks Sr., Charlie Chaplin and President Warren Harding, and punctuated with world travel totaling 125,000 miles by the age of 12.

The Hollywood stars were colleagues in John Presper Eckert Sr.'s World War I bond drive efforts and the travel included the elder Eckert's business and vacation trips.

Exceptional not only in the opportunities fate handed him, Eckert built a crystal radio set on a pencil at the age of eight and at 15 devised a remote-controlled bomb that exploded on his school stage from a pushbutton box in the audience.

The school was the William Penn Charter School, the oldest private boys' school in the U.S., where Eckert breezed through his regular courses and took on two years of college math, as well. After graduating in 1937, he entered the University of Pennsylvania's Moore School of Electrical Engineering, where he stayed to teach, do research and pursue graduate studies after receiving his bachelor's degree in 1941.

Although obviously gifted, Eckert's early career at the Moore School was less than brilliant, because he had been unwillingly steered away from MIT by his parents.

Although anger at his parents showed in his first two years' grades, "I got over my anger and got top marks in my final exams," he said.

Undergraduate grades notwithstanding, Eckert's mind was never idle. During a summer recess in his undergraduate period, Eckert designed and built a device for measuring the concentration of naphthalene vapor by means of ultraviolet light. During his last year of schooling, he perfected circuits for using strain gauges. He later worked to develop instruments for measuring the fatigue limits in metals.

When World War II broke, he designed and built a device for recording rapid changes of very small magnetic fields. The device was used to test methods for setting off enemy magnetic sea mines.

Other war-related projects were Eckert's work on solving several problems involving radar and on various timing devices for measuring radar targets to an accuracy of one yard out of 100,000 yards. It was here that he first applied digital concepts involving counters to electronic engineering problems.

It was in Eckert's role as lab instructor, at age 22, that he met the 34-year-old Mauchly, one of 20 "students" — 16 of whom had Ph.D.s — whom Eckert had to simply "aim in the right direction." The course was an eight-week government-paid defense course in electronics.

"I had little to do," Eckert recalled, "so John and I talked. Since he taught physics, there was no need to teach him. Instead we discussed what we really wanted to do — build a computer."

Two years after their initial meeting, when Eckert had received his master's degree in electrical engineering, the two joined forces to begin work on the Eniac.

In Mauchly, Eckert had found a mind that complemented his almost perfectly and did so for many years, until Mauchly's death in 1980.

## John Williams Mauchly: Humanistic Scientist

"History is certainly going to change its point of view about me and Eckert and lots of other people. We think it'll change with respect to who did what so as to reflect the part we really played in the invention of the computer."

— John W. Mauchly (1979)

Mauchly's words — spoken a few months before his death — encapsulate the anxieties, claims and counterclaims that still surround the conception, design and building of the first general-purpose electronic digital computer.

And it is Mauchly who is said by some to have studied the work of Dr. John Atanasoff (see related story) before beginning his historic efforts toward the Electronic Numerical Integrator and Calculator (Eniac).

Indeed, Minneapolis District Court Judge Earl Larson ruled in 1973 (*Honeywell, Inc. v. Sperry Rand Corp. & Illinois Scientific Developments, Inc.*) that "Eckert and Mauchly did not themselves first invent the automatic electronic digital computer, but instead derived that subject matter from one Dr. John Vincent Atanasoff."

The judge also found, however, according to Eckert, "The application for the Eniac patent was filed by Mauchly and Eckert whom I find to be the inventors. Of the 17 claims of the Eniac patent at issue in this court, Honeywell has failed to prove the

readability of claims 8, 9, 36, 52, 55, 56, 57, 65, 69, ... or any of them on Atanasoff's machine or any of the work of Atanasoff."

In spite of the seemingly contradictory ruling and whatever the truth, it is Eckert and Mauchly who are generally accorded the honors and awards given inventors, while Atanasoff remains almost entirely out of the spotlight.

John William Mauchly was born in Cincinnati, Ohio, on August 30, 1907. As a young boy, he wanted to be a street car conductor, then a fireman. By high school, he expected to become an engineer.

Mauchly won a state scholarship to the electrical engineering college of Johns Hopkins University, but found after two years that his natural inclination followed that of his father: Physics was his real interest.

The university advanced the outstanding Mauchly in his sophomore year into the doctoral program in physics, which he completed in 1932. After receiving his Ph.D., Mauchly worked at Johns Hopkins for a year as a research assistant, then became head of the physics department at Ursinus College in Collegeville, Pa.

Mauchly was a favorite among the students as much for his sense of humor as for his dynamic teaching methods. "Ursinus insisted on teaching the day before Christmas," Eckert recounted.

In a stratagem designed to get around the problem without openly defying the dean of the college, Mauchly "started the lecture, yawned a few times, sat down next to the rostrum, put his elbow on the desk, started talking more and more slowly, and finally fell asleep in mid-sentence," Eckert said.

Some student confederates in the class got the rest of the group to tip-toe out of the room, completely convinced Mauchly's "Professor Ho-Hum" act was real, Eckert explained.

Mauchly taught at Ursinus from 1933 to 1941, during which time his scientific work centered on weather science, an area that called for long, tedious calculations. Hoping to develop a small, cheap computing device, Mauchly began experimenting with ways of counting electronically and reportedly conceived of an electronic calculating device that would utilize vacuum tubes.

In 1941, Mauchly enrolled in the eight-week defense course in electronics at the Moore School of the University of Pennsylvania — where he met Eckert — and stayed on as an instructor.



Mauchly (left) and Eckert

Courtesy Sperry Univac



It was a team like Rodgers & Hammerstein or Gilbert & Sullivan — a perfect blend of complementary talents that time after time produced compelling works to eventually enchant millions.

Together, Eckert and Mauchly produced four classics: Eniac, Edvac, Binac and Univac I, and without question deeply influenced the development of the computer industry as we know it.

Both were already interested in the possibilities of automatic computation when World War II turned possibilities into urgent needs. In 1942, the Ballistic Research Laboratory of the U.S. Army Ordnance Department was assigned the job of recomputing firing and bombing tables for the springier ground of Africa and for proposed gun/projectile combinations, rockets, missiles and other strategic arms.

Manual computation of a single trajectory for a given set of conditions normally took military specialists several hours with a desk calculator. In a "crisis of calculating," as Eckert called it, hundreds of operators were needed around the clock to develop the needed ballistic tables.

Mauchly wrote a memorandum in 1942, based on discussions with Eckert, called "The Uses of High-Speed Vacuum Tube Devices for Calculating," suggesting that his idea for a vacuum tube computer would fill the Army's bill.

The memo was misplaced and lay buried for almost a year before being resurrected by then-Lt. Herman H. Goldstine, formerly an assistant professor of mathematics at the University of Michigan before he joined the Ballistics Laboratory at Aberdeen Proving Grounds, Md.

At Goldstine's urging, Mauchly unearthed the original shorthand notes for the memo, had it reconstructed and sent immediately to Washing-

## Part 10 ... ECKERT & MAUCHLY: Pulling It All Together

By Marguerite Zientara  
CW Writer/Analyst

ton, D.C., for approval.

At one of the subsequent Washington meetings on the subject were Goldstine, director of the laboratory Col. Leslie E. Simon and Prof. Oswald Veblen of Princeton University's Institute of Advanced Study, among others.

"After listening for a short while to my presentation and teetering on the back legs of his chair, [Veblen] brought the chair down with a crash, arose and said, 'Simon, give Goldstine the money,'" Goldstine recounted in his 1972 book.

From that point, the project moved very quickly. A team of 50 people (at its largest) was organized and, a year after proposing the idea, Mauchly — who was teaching full-time — found himself consultant to a project that owed its existence to a \$400,000 contract.

Eckert — the only full-time person on the project — served as project manager and chief engineer and Capt. Goldstine maintained the technical liaison with the Ballistic Research Laboratory.

Begun in April 1943 — on Eckert's 24th birthday — Eniac was finished more than 200,000 man-hours later, three years after it was started. An enormous, clumsy piece of equipment by today's standards, Eniac weighed 30 tons and covered 1,500 square feet of floor space.

It contained more than 18,000 vacuum tubes, 500,000 joints soldered to connect all the circuits, 70,000 resistors, 10,000 capacitors and 6,000 switches. Eniac used 150 kilowatts of electricity, about equal to 200 horsepower.

With only two of its 40 panels containing mechanical relays, Eniac proved to be the breakthrough in speed that automatic computation was striving for. Completed only two years after Howard Aiken's IBM/Harvard Mark I [CW, Sept. 21], Eniac performed calculations 1,000 times faster than that relay machine.

Featuring the all-important concept of subroutines — now at the heart of all modern computers — Eniac also broke new ground in being electronic and containing stored program

features.

Installed at the Aberdeen Proving Grounds in 1947, Eniac worked on problems of weather forecasting, wind tunnel design and the study of cosmic rays, in addition to ballistics tables. At 5,000 additions and 1,000 multiplications per second, Eniac in half a minute could solve a problem usually requiring 20 hours with a desk calculator.

Although built for the purposes of war, Eniac was not completed until 1946, a year after Japan surrendered. Nevertheless, it was used for the next 10 years, and parts of it can now be seen in the Smithsonian Institution, as well as at the Fort Carson Museum in Fort Carson, Colo.

In spite of its many advances, Eniac featured a rather overwhelming drawback: It was partly controlled by a combination of switches and a telephone switchboard-type "patch cord" arrangement. To change a program, the operator had to disconnect wires and plug them into different locations, a task that usually took several hours.

While Eniac was a vast improvement over the speeds of the previously developed mechanical analyzers, it quickly became evident that its still cumbersome programming technique would negate the computer's inherent speed. Eckert and Mauchly started planning a machine that would store the program electronically in the same way it stored data.

The "stored program" machine, to be called the Electronic Discrete Variable Automatic Computer (Edvac), would not be completed until 1951, and would not be completed by Eckert and Mauchly themselves.

While Eckert and Mauchly worked on the concept, they were joined in 1945 by the brilliant Hungarian-born mathematician John Von Neumann, who had already worked informally with the project team.

In June 1945, Von Neumann pre-

## J.V. Atanasoff: Early Efforts

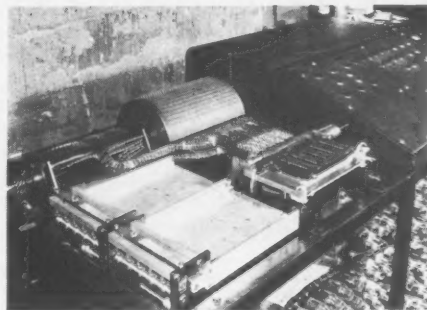
John Vincent Atanasoff, said by some to have directly inspired John Mauchly's work on the Eniac computer, was born in 1903, the son of a Bulgarian immigrant who had worked his way through Colgate University and become an electrical engineer.

His mother was a school teacher with a natural ability in mathematics, which she passed on to her precocious son. When John was nine, he learned to use his father's slide rule and studied trigonometry, calculus, radio theory and physics.

In the early 1930s, Atanasoff taught at Iowa State College in Ames, Iowa, after earning his Ph.D. in theoretical physics from the University of Wisconsin. While teaching, Atanasoff was faced with the same problem that inspired other mathematicians and scientists to contemplate a method of automatic calculation: Most of the problems put to his students required the solution of linear algebraic equations with many variables.

With some knowledge of

(Continued on Page 38)



Courtesy Digital Computer Museum

The Atanasoff-Berry Computer, 1942. The computer was dismantled and only the drum preserved.

(Continued on Page 33)

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(Continued from Page 31)

pared an outline of data learned from Eckert and Mauchly called "First Draft of a Report on Edvac," in which he described stored program computers. The document was published even though the material in it was classified information, according to Eckert.

Because the draft carried only Von Neumann's name as author, he has generally been regarded as the originator of the stored-program concept, although Eckert claims it was he who originated the idea.

This point is another of several that are clouded by ill feelings and controversy in the history of computing. Eckert and Mauchly left the Moore School in June 1946 over patent disagreements — seriously impeding progress on Edvac — and in 1947

formed a partnership, known as Electronic Control Co., to design and build a Universal Automatic Computer (Univac). It later became Eckert-Mauchly Computer Corp., of which Mauchly was president and Eckert vice-president.

Even though they had formally left the Moore School in June, that summer they both gave several lectures

there as part of a course entitled "The Theory and Techniques for Design of Electronic Digital Computers."

"That course did more for computing than anything," Eckert said recently. "We communicated more information then than anything else did. The students read like a Who's Who of Computing."

From information obtained during

the course, Prof. Maurice Wilkes of the UK's Cambridge University returned home to begin work on the Electronic Delay Storage Automatic Computer (Edsac), which he completed two years before the Edvac was finished.

Before the struggling Eckert-Mauchly Computer Corp. could fin-

(Continued on Page 34)

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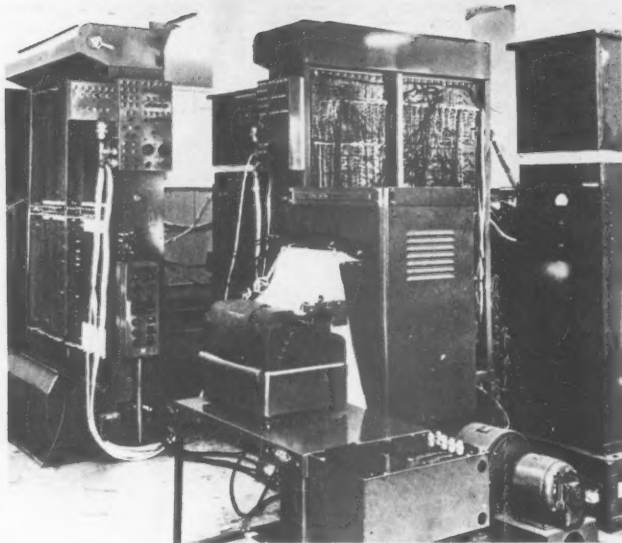
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## The History of Computing



Binac, Completed in 1949.

Courtesy Sperry Univac

(Continued from Page 33)

ish Univac — because of delays by the Bureau of Standards on the Census Bureau contract — it took on another project to gain more capital. The Binary Automatic Computer (Binac), begun in 1947 for the Northrop Aircraft Co., was completed in 1949.

Binac, then, was the country's first operational stored-program electronic digital computer, was cheaper and faster than Eniac or Edvac and could handle magnetic tapes instead of punched cards.

Two separate Binacs were built; they could be used separately or together to check on each other. In Binac, Eckert and Mauchly incorporated the ideas they had first proposed for Edvac, resulting in a much smaller and more efficiently designed machine because of the total use of stored programs and an all-binary system instead of Eniac's partially binary system, Eckert explained. During the late 1940s, American Totalisator had agreed to finance Eckert and Mauchly's R&D work. In October 1949, however,

their main support, American Totalisator Vice-President Henry Straus, was killed in an airplane crash, leaving the pair in serious financial difficulty.

After exhausting every effort to get additional support, Eckert and Mauchly sold their company to Remington Rand Corp. in February 1950. Remington Rand merged with the Sperry Corp. in 1955 to form Sperry Rand.

In 1951, Eckert and Mauchly completed work on Univac I, the world's first commercially produced electronic digital computer. The Census Bureau, with the National Bureau of Standards as its agent, was the first organization to order a computer.

Dedicated in June 1951, Univac I was first used to complete the 1950 census. It was the first commercial computer to use a compiler to translate program language into machine language.

In 1952, a second Univac I became the first computer used to tabulate returns in a U.S. presidential election. In the race between Dwight D. Eisenhower and Adlai Stevenson,

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Univac I computed Eisenhower the victor only 45 minutes after the polls closed.

The Department of Commerce retired the original Univac I in 1963, after more than 73,500 hours of operation. Parts of the machine are now on display in the Smithsonian Institution.

After the completion of Univac I, both Eckert and Mauchly remained at Remington Rand, Eckert as engineer and Mauchly involved in the logic design and software for Univac.

Eckert went on to do development work on the Livermore Automatic Research Computer (Larc), the first machine to feature multiprogramming and multiprocessing, and helped develop Univac III.

Eckert remains at Sperry Corp. to this day, as vice-president of the Sperry Univac Division, although he doesn't do "that much inventing anymore." He does educate users about the firm's ongoing research and development, however, since "they're more likely to believe someone who's worked on computers all his life than a sales-type representa-

tive," Eckert observed.

Eckert lives in Gladwyne, Pa., with his wife, the former Judith Ann Rewalt, and two of their four children.

Mauchly worked for the Univac division of Sperry Rand as director of Univac applications research until 1959, when he formed Mauchly Associates, a group that developed computers for scheduling tasks and introduced the critical path method (CPM) for scheduling by computers.

Mauchly also formed a systems consulting company called Dynatrend in 1968. John Mauchly died January 8, 1980, after a long illness. He is survived by his wife, the former Kathleen (Kay) McNulty, who was a programmer for Eniac, two sons and five daughters. In his eulogy of Mauchly, Eckert said, "John saw things really for what they were and not what people told him they were. And there's a big difference between those two things, when you come to try to invent something. It's the difference between being tied down by tradition and being guided by tradition into doing something new."



Courtesy Sperry Univac

Eckert and newsman Walter Cronkite examine Univac I, 1951.

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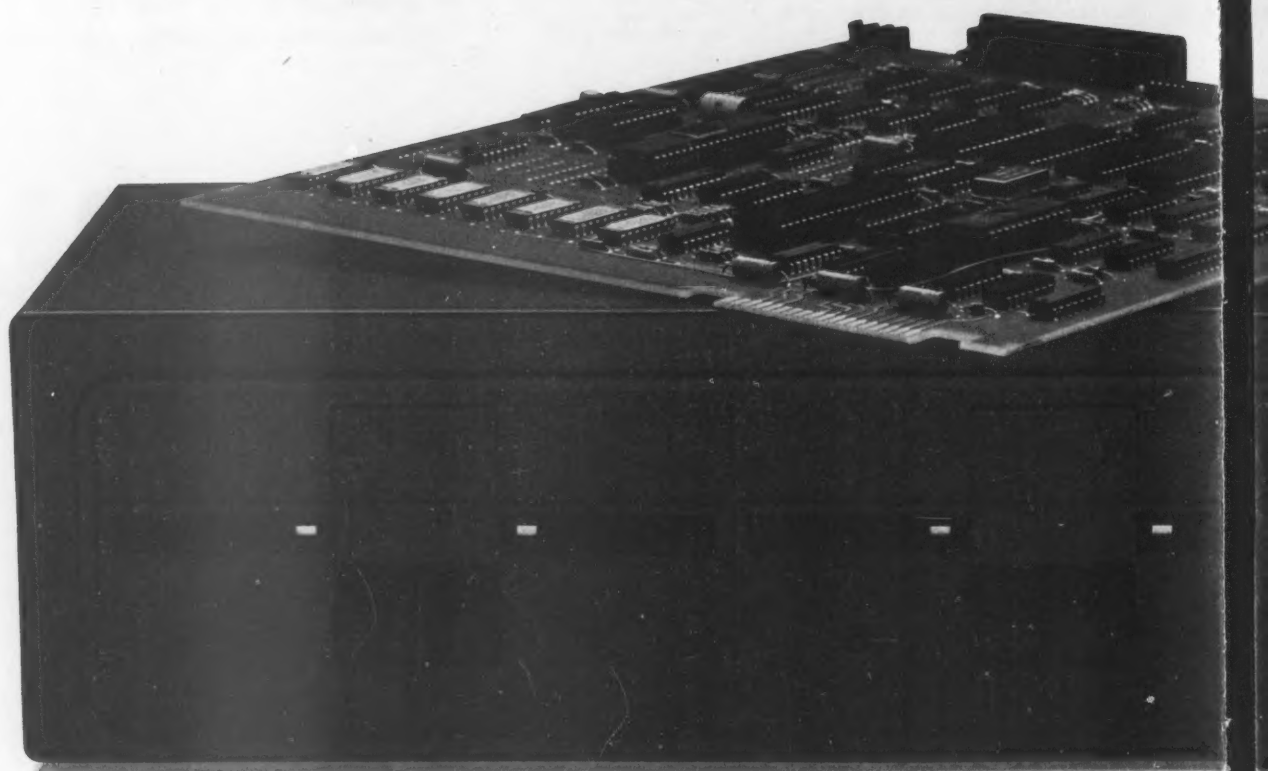
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# The History of Computing

(Continued from Page 31)

Babbage and Pascal, Atanasoff began an extensive study of the possibilities of computing technology. "I commenced to go into torture," Atanasoff explained. "For the next two years my life was hard. I thought and thought about this."

## Dramatic Sequence

Finally, in a dramatic sequence, Atanasoff was inspired with the answers to his questions, according to his expert witness testimony in the Honeywell, Inc. vs. Sperry Rand Corp. and Illinois Scientific Developments, Inc. case.

"One night in the winter of 1937, my whole body was in torment from trying to solve the problems of the machine," Atanasoff testified. "I got in my car and drove at high speeds for a long while so I could control my emotions."

Although Atanasoff usually drove in such a way "for a few miles," that night he claimed to have been "excessively tormented" to the point of driving 189 miles nonstop across Iowa, over the Mississippi River and into Illinois.

"I knew I had to quit," Atanasoff said, so he stopped at a tavern and ordered a drink. In the tavern, "things seemed to be good and cool and quiet," he recalled, and there his torment dissipated.

The jumble of thoughts and inspirations that had tormented Atanasoff for two years suddenly crystallized into four definite solutions to the problem of electronic computing.

Atanasoff decided he would incorporate the following into an electronic digital computer: binary code, nonratcheting logic, serial calculation and regenerative memory.

There followed "many months" during which Atanasoff perfected the ideas he had conceived in the roadhouse in Illinois, including devising his previously nonexistent type of logic, he re-

called in a recent interview.

Applying to the Iowa State Research Council in early 1939 for money to build his computer, Atanasoff received an initial grant of \$650, which bought him the part-time assistance of an engineering graduate student,

Clifford Berry, as well as materials to build a "breadboard" model.

When the breadboard model was finished in the fall of 1939, Atanasoff and Berry received two more grants from the school, bringing the total to \$1,500. In late 1940, another

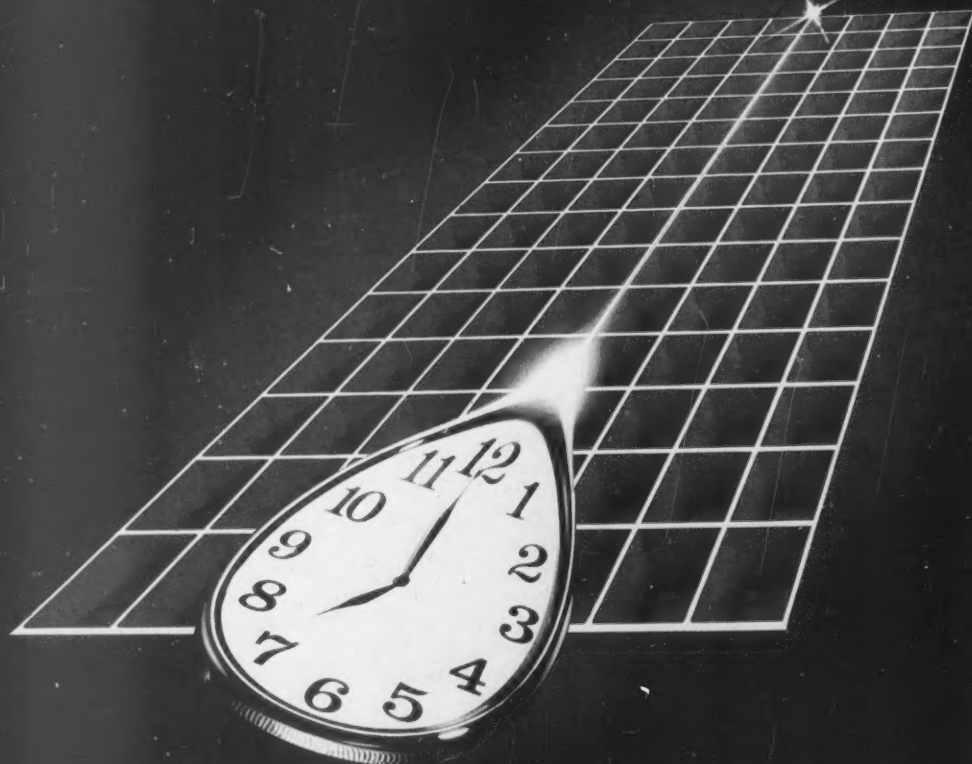
\$6,500 was acquired from a private foundation.

## Meets Mauchly

It was in December 1940 that Atanasoff met Mauchly, at a meeting of the American Association for the Advancement of Science. Atanasoff

told Mauchly about his computing machine and invited Mauchly to see it.

In June 1941, Mauchly spent five days as Atanasoff's house guest, during which time they discussed and observed the Atanasoff-Berry Computer (ABC). Mauchly



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also read and made notes on the complete description of the machine, but did not take the written description with him when he left.

### ABC Capabilities

At the time of Mauchly's visit, Berry was working on a

binary card punch and reader for input/output and slow memory. Later, the ABC was capable of solving up to 29 simultaneous equations with 29 variables.

Late in 1942, Atanasoff and Berry left Iowa State. Berry took a job with Consolidated

Engineering in Pasadena, Calif., and Atanasoff accepted a research position with the Naval Ordnance Laboratory in Washington, D.C., where he became the head of the Acoustics Division.

Atanasoff was disappointed that Iowa State College did

not apply for a patent on his ABC, which it had promised to do, but he was "well aware" that such a patent would not make him financially independent, he said recently.

According to Eckert, however, Atanasoff's work was

"too incomplete" for him to obtain a patent.

### Court Ruling

Nevertheless, it was the Eniac patents case that inspired District Court Judge Earl Larson to find in 1973 that it was Atanasoff who actually invented the concept of the "automatic digital computer."

After that ruling, Mauchly maintained that the ABC was "just a crude little machine that wouldn't really do anything" and that Eniac was "a highly sophisticated and operational machine."

Furthermore, Mauchly reportedly commented, "Eckert and I wish that the Sperry Rand people would have appealed this because it does leave us in a bad position because of the misunderstanding of the court."

But Sperry did not appeal the decision, a point that Atanasoff feels proves the validity of his claims.

In view of the continuing controversy surrounding the issue, however, Atanasoff has "not decided to relive the past," he noted recently, but indicated he will write "a full statement" of his early work on computers.

### Business Careers

Besides his inventing work, Atanasoff was a businessman whose firm, Ordnance Engineering Corp., was sold to Aerojet General in 1962. He holds approximately 30 patents.

The awards Atanasoff has received for his work in computing include the Order of Cyril and Methodius, First Class, Bulgaria's highest honor for scientists, in 1970, and two honorary doctor of science degrees.

Atanasoff lives in a house which he helped design on a farm near Frederick, Md., with his wife and 100-year-old mother.

As for Clifford Berry, his scientific promise was not to be fully realized. In 1963 he was found dead in bed with a plastic bag over his head. His death was ruled a suicide.

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## EDITORIAL

### Getting Ahead in the '80s

The Data Processing Management Association's (DPMA) model curriculum for education in computer information systems is worth reading by anyone contemplating or already engaged in an information processing career.

The model's value lies not just in the guidelines it sets for educators. The final report of the DPMA's Executive Committee on Model Curriculum Development details what information processing professionals will need to know in the 1980s and suggests why they will need to know it.

This model was generated by a team of commercial systems managers as well as educators, drawing on real world experiences and real world concerns about coming developments in information technology.

As described in a recent *Computerworld* In Depth article [CW, Sept. 21], the model calls for courses in office automation, information resource management, distributed data processing and other topics that most current systems professionals have only encountered outside classrooms.

What it will take to get ahead in information processing 10 years from now differs substantially from what it took 10 years ago. Therefore, those information processing professionals who have climbed ladders on the basis of expertise hotly desired in the past should not assume they can keep on climbing with only the same expertise.

In the future, promotion-minded systems people will need plenty of the expertise DPMA has specified in its curriculum model. Systems people will need to understand the factors that influence managers throughout their organization, the external problems that harass the organization as it tries to reach the goals set by top management, and the ways in which data processed by systems is supposed to improve end-user decision making.

Those who study the way relations between managers and systems staffers change in time have identified stages when the prestige and influence of programmers and analysts rose and fell. The coming generation of computer information systems experts may restore a condition of mystique and clout presently undermined by routinization of software specialties.

Structured methodologies for software development and the growing richness of software package offerings by vendors have mitigated demand for skilled programmers and analysts in many organizations. As employers find less need for in-house development and less need for an extensive range of skills among programmers hired for in-house development, the image of programmers shifts lower in the minds of top managers. So does the image of people who manage programmers.

But systems professionals of the 1980s who can escape being pegged as "supervisors of code writers" by applying computer information systems expertise with genuine benefit to managers of end-user departments will shift high in the minds of top management, if not society generally.

## DATA PAST

### Ten Years Ago Oct. 6, 1971

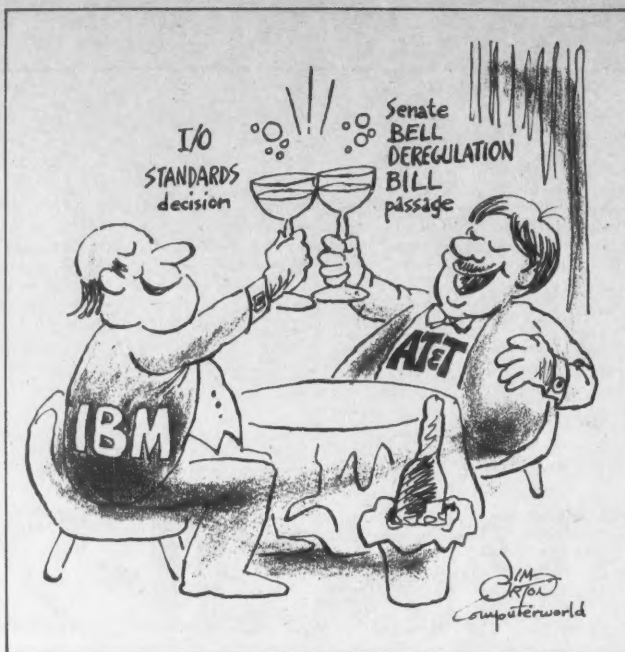
OAKLAND, Calif. — Computer Synergy, Inc., a facilities management firm, offered to organize a special interest RCA users group of users concerned with conversion problems. Synergy official Philip Carville said his firm mailed information on this effort to all known RCA users.

The purpose of the group was to act as a clearinghouse for information on converting from RCA equipment.

### Five Years Ago Oct. 11, 1976

WASHINGTON, D.C. — The Tax Reform Act of 1976, signed into law by ex-President Gerald R. Ford, expanded use of the Social Security number (SSN).

State and local governments could now use the SSN as an identifier for tax administration purposes, in general public assistance programs, for drivers' licenses and for motor vehicle registration.



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## LETTERS

### On Contract Negotiators

James E. Station's recent article on the development of standard contracts for users, "Standard Contracts for Users a Poor Idea" [CW, Oct. 12], was both interesting and amusing. It was interesting from the respect that more and more DP professionals are finally recognizing the need for professional contract negotiators in the overall decision-making process. The key word here is "professional." Station seemed to worry a lot about the so-called "timid" user. The "timid" user, indeed!

Having been involved in the procurement, negotiation and contract development of hardware and software for more than nine years, nothing scares me more than the high-level DP executive who is so anxious to get the hardware or software in-house that he will hastily sign any vendor agreement placed before his desk; or will commit himself to the product without any review of the associated contract; or will play Perry Mason or Henry Kissinger without the inclusion of the purchasing or legal departments.

The executive may be a technical "whiz-bang," but his competency in negotiating the complex aspects of a DP contract, in most cases, is questionable. A user can no longer afford to be contractually ignorant or timid; nor can he dispel the need for good contract negotiations. To do so is professional suicide.

The idea of utilizing standard DP contracts is the biggest joke of all. There is no question, as Station stated, that guidelines detailing and explaining specific technical and legal provisions would be of significant help to the user. However, any professional contracts person will tell you that a DP contract is unique and tailored specifically to the requirements and application of the user

while limiting the company exposure to legal risk and liability.

The use of a standard contract will never work and any firm that thinks it will learn its lesson the hard way. Standard DP contracts of any kind are far too general and will never replace the expertise and legal knowledge of a good contract negotiator; they will merely postpone the user's professional suicide to a later point in time.

A DP contract, if negotiated properly, can be a marriage certificate to a mutually beneficial long-term relationship between the user and vendor. If negotiated poorly or not at all, the marriage could end up in a very costly divorce.

Paula L. Park

San Jose, Calif.

### Educator Neglect

The recent In Depth series on computing education made it clear that software maintenance — the change and enhancement of existing systems — continues to be neglected by educators [CW, Sept. 21]. Neither the Data Processing Management Association nor the Association for Computing Machinery mention it; yet industry statistics show that most DP professionals work on modifying, not developing, systems; and morale in this sector of the industry is disastrously low.

If you have low productivity and low morale among your maintenance personnel, the remedy is in your hands. Use your economic power. Demand that software maintenance becomes a part of the computing education curriculum at universities and in in-house training.

Girish Parikh

Chicago, Ill.

Nicholas Zvegintzov  
Staten Island, N.Y.

SOFTLINE / Werner L. Frank

# Data Management for the End User

A recent survey of available software products for microcomputers led to the opportunity to review PFS and PFS:Report, two related offerings from Software Publishing Corp. in Palo Alto, Calif.

The product name PFS, though not elucidated by the manufacturer, presumably stands for Personal File System. That is exactly what is made available in this user-friendly and comprehensive software product that allows for the standard data management features of defining files, updating such files, searching the files and reporting from them. For \$95, one obtains a rather complete system that offers all of the above facilities, given the availability of Apple Computer Inc.'s Apple II system with 48K bytes of memory, disk drive and video monitor.

For a second \$95, one gets the reporter portion of the system, which allows for a broader range of output generation. In both instances, a printer will add measurably to the operability and usefulness of the software.

We chose to review these programs for two reasons. The first is our interest in the development of serious software for the very smallest of computers. The second is to further understand the cost-benefit aspect of software. What does a dollar's worth of software buy?

The documentation for PFS and PFS:Report comes in a very easy-to-read and pleasant format that introduces one to all the features of the system by a natural progression. Illustrations are abundant; the diagrams and examples make it a self-

teaching experience.

In one word, PFS is elegant. The packaging of the software, the features of the system and the supporting documentation reflect the origin of the vendor and the key people. Indeed, they are ex-Hewlett-Packard Co. personnel and carry forward some of the excellent software ideas already found in much higher-priced and more powerful HP systems, namely, Image and View.

## Big Software Comparison

Since my principal experience has been with big mainframe computers, I am tempted to compare PFS with big software systems. Feature by feature, PFS stands up exceedingly well against systems that have a substantially higher price — up to five figures. In the following, we highlight the major functions of this software.

Consider, for example, file definition and record creation. Defining the file is tantamount to defining the input screen formats that are subsequently used as data entry forms in building the file itself. The screen painting capability of PFS is quite natural and simple. The software's authors call this process an automatic schema generator.

The system does not have any data entry validation capacity since all field values are treated as variable length character strings. This characteristic allows several unique features that are often not found in systems a thousand times as expensive. First, data entered for a specific field need not have consistent format. Dates, for example, could be entered as 6/8/81 as well as 6-8-81, or even 6

August 81. Telephone numbers may appear as 213-555-1234 or simply 555-1234 or even 5551234.

This flexibility in telephone number representation could be useful in storage saving if, for example, 90% of the telephone numbers are in a known area code and remote area codes occur in the remaining 10%. In other words, the system was designed to handle exception cases on an ad hoc basis.

During search or reporting time, the field values can be dynamically interpreted as either an alpha string or a numerical quantity. In the latter case, all embedded nonnumeric characters are simply deleted and the numbers concatenated to form a numerical quantity. (The date, whether represented as 8/10/81, or 8-10-81, will become 81081 when treated as a numeric quantity; the values \$100, \$3.99, \$10 and \$4 will automatically be converted to 100.00, 3.99, 10.00 and 4.00.) Think of what this does in doubling up the role of field values, for output presentation purposes on the one hand, and for numerical operations on the other.

Another important aspect of file design is that of storage requirements. The variable length field and record facility allow dynamic expansion of data as long as there is sufficient entry room on the screen opposite each of the protected item labels. Therefore, if Zip Codes go from five to nine characters there is no problem as long as there is space on the screen opposite the item "ZIP: " for up to nine positions.

In this system one can avoid the often unpleasant task of deciding a pri-

ori how many character positions to leave for names, addresses and others. As field values increase or decrease in character length, storage of the data will be automatically adjusted.

Files are automatically indexed by a hashing technique with respect to the very first data item in the record definition. This limitation to a single index is acceptable for a system geared to the personal computer. Each of the other fields, however, can be employed as a sequentially accessed search key.

## Flexible System

The retrieval logic operating in field searches can be against fully or partially matched character strings or matched on a numeric basis. This makes the system extremely flexible, allowing for retrieval logic that can find any record for which a specified field must contain a stated character string or numeric quantity. Further, the search can be qualified to be either a string at the beginning of the field value in the form of a prefix, at the end in the form of a suffix or floating somewhere in the middle. The numeric search is activated if the field is tagged for numerical processing.

Unfortunately, the retrieval logic is limited and therein lies one of the chief weaknesses of PFS. First of all, only "AND" logic is allowed. Secondly, numeric searches are limited to greater, less or equal comparisons. The system would be much more powerful if "OR" logic were also permissible.

(Continued on Page 46)

HUMAN CONNECTION / Jack Stone

# Manager Absorbs Role of DP Coordinator

It seems that nowadays almost every organization is searching for new and better ways to improve communications between the computer center and user departments. From what I've observed, the major thrust of computer centers appears to be in the direction of expanding the interpersonal skills of the systems analyst. However, this approach is not too viable if the center work load is extra-heavy, its head count is frozen and the funds for in-house DP training are drastically reduced — as is the case with so many organizations.

In recognition of the need for additional headquarters support of newly developing field sites, one user organization spawned the idea of adding a "DP coordination" responsibility to its headquarter's administrative group. Here are some highlights from my interview with Carol Griffin, who wound up with the assignment.

**Stone:** What are your current responsibilities with respect to office automation?

**Griffin:** My task is to work with senior executives and data processing managers at several dozen of our branch offices. I help to assure the

controlled installation of minicomputers and assist in the expeditious resolution of the usual postinstallation questions and problems.

**Stone:** I presume that you were selected for the coordination function because of an extensive background in data processing.

**Griffin:** Well, not really. As a matter of fact, I never took a computer course in college. The closest I came was in my upper-class years when I seriously considered a "computer concepts" elective, but settled on a "Spanish drama" offering instead.

**Stone:** Where did you receive technical training to qualify you for the job?

**Griffin:** I attended a three-week introductory course given by our computer department, which was an excellent starting point.

Of course, there were some topics that went right over my head, so, like many neophytes before me, I spent long hours at the terminal trying to figure out what was going on in the system.

**Stone:** Having had all this wonderful experience, how would you rank yourself in terms of DP zealotry, on a scale of 1 to 5?

**Griffin:** I really feel that such a classification would not properly characterize my views toward office automation. So much depends on the management and resources situation in the particular office. Where it appears that the senior executive is willing to commit the time, energy and manpower to the program, then I'm a strong advocate of computerization. But in those instances where the commitment is lacking, I am far less than enthusiastic.

Fortunately, our machines are being initially installed on a stand-alone basis, so we don't have all the sites cutover to computer-based systems at the same time.

I should also say that my long-term interest lies in management and that I see my automation experience as an important component of my program of self-development.

**Stone:** What is the most challenging aspect of your automation responsibilities?

**Griffin:** Helping the people in the user and computer departments understand each other. It's sometimes unbelievable how much confusion develops from simple misunderstanding; so I try to resolve commu-

nications difficulties as soon as possible and certainly before they begin to fester and cause serious operational problems.

For example, I encourage our field managers to forward their DP problems to me first. I am now able to resolve the vast majority of them, thereby releasing our computer people to work on more pressing matters. Similarly, I've asked our DPers to pass information destined for the field to me first. If I can understand it, then it's forwarded on — and if I can't, we work together on the message until I do.

**Stone:** Do you sometimes feel overwhelmed by the technical aspects of the job?

**Griffin:** I hardly classify myself as "technical" and it's probably for this reason that our computer people don't seem threatening to me. I present myself to them only as a fairly knowledgeable representative of the end users, trying to get a job done — and our DPers always seem to respond to my needs.

Letters to Stone should be addressed to him at Computer Education International, Suite 222, 2233 Wisconsin Ave. NW, Washington, D.C. 20007



## CDP Unwelcome

I would like to dispute the Reader Commentary by Frank Fillmore, Jr., "Certification More Important Than Ever" [CW, Oct. 12].

First, by giving the same test — for the Certificate in Data Processing (CDP) — to all DPer, the Institute for the Certification of Computer Professionals (ICCP) is not classifying DPer on a "case-by-case" basis, as Fillmore claims. A case-by-case basis implies that each person is judged individually without

a preset, arbitrary standard. No one would claim that the Scholastic Aptitude tests classify students on a case-by-case basis; yet that is the claim made for the CDP.

Second, the ICCP's understanding of what is important to the DPer is highly skewed — away from "parochial" (his word, not mine) technical matters. While the DPer's relationship with his

organization is important, it should not be a part of a test to measure technical competence (as the CDP claims to do). How do you accurately measure an employee's ability to work in an organization?

Furthermore, standardized tests of any kind are just not very accurate. Some people are very good at taking tests and yet are not as knowl-

edgeable as their test scores would indicate. Conversely, some people don't do very well on tests and yet are extremely knowledgeable about their field.

Third, certification is merely the first step toward licensing. How long will it be before we require a license to "practice" data processing?

Once certification (or licensing) is instituted, these

measures are invariably used to restrict entry into the field. There is nothing to suggest the ICCP is any different. In fact, the first part of the article argues that the need for "professional" DPer will be much less in the future (which contradicts every estimate of the true situation that I'm aware of). This attitude gives their true motives away.

Finally, let the free market continue to work. For 30 years DP has been virtually the only area of the economy where the government, labor unions and certification or licensing boards have had very little impact. Consequently, DP has seen the most explosive progress and growth of any industry.

Certification is just a not-so-subtle attempt by the ICCP to gain control over the data processing labor market. The ICCP has no right to step between me and any potential employers. I hope the logical and independent nature of DPer will lead them to reject this ridiculous "solution" to a problem that will solve itself.

Scott L. Eudaley  
Torrance, Calif.

## CDP Exam Irrelevant

Frank C. Fillmore Jr.'s commentary on the Certificate in Data Processing (CDP) examination has prompted this letter against that certification as presently structured "Certification More Important Than Ever" [CW, Oct. 12].

My company specializes in software for small business computers, but the things we do are not very different from the tasks performed in any in-house data processing department; we determine user's needs, design software to meet those needs, program to meet the design criteria and install the completed systems. A person's ability to actually perform one of these tasks is critical to his employment by my firm or by any data processing department. Not one of these abilities is accurately measured or predictable from the CDP examination.

Like the CPA examination, the CDP examination can be passed exclusively with "book" knowledge and a good understanding of current technical vocabulary. These give no assurance that accurate analysis will be done or effective, error-free programs will be written.

Until the essentials are measurable by the exam, managers will continue to treat the CDP as an item for hardware sales representatives and consultants, not a requirement for technical professionals.

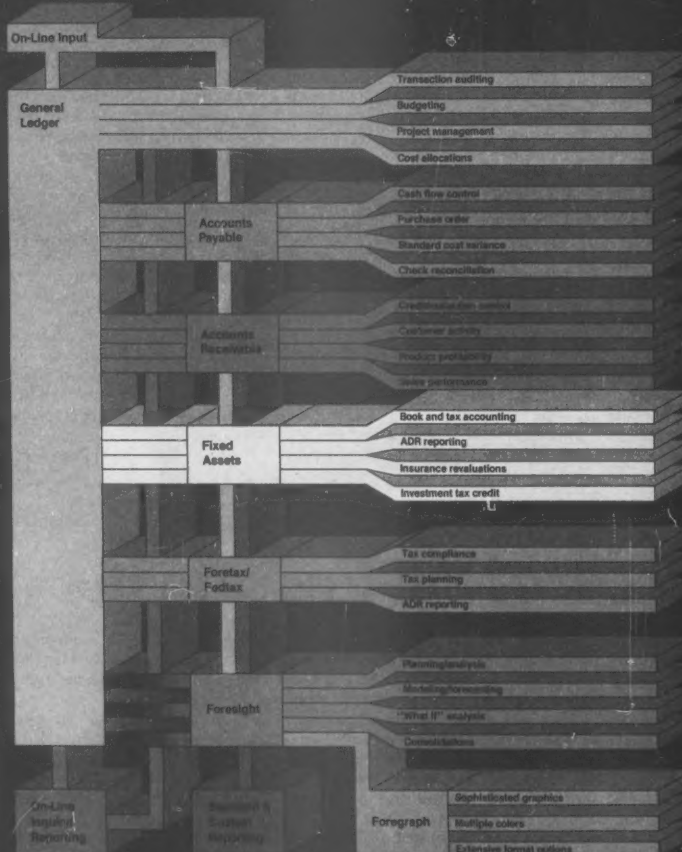
James L. Gillaspay  
President

Paradata Southwest  
Houston, Texas

## LETTERS

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## Missing Facts

The article on local network development, "Exec: Local Nets' Fast Pace Breeding Problems" [CW, Oct. 19], left out some important facts. Dr. Harvey Freeman was quoted as saying Datapoint Corp. claims to have 10,000 Arc systems installed.

This is not true. We have publicly stated that we have more than 1,500 Arc systems installed. (The 10,000 will come — give us time.) Ten thousand could be a rough approximation of the number of processors.

The article also omits the fact that Tandy Corp. and Inforex, Inc. use the Arc local network (called Arcnet).

In that light, it is not a closed network and I would like to set the record straight.

Gerald Cullen  
Vice-President of Marketing  
International Operations  
Datapoint Corp.  
San Antonio, Texas

## The Court Speaks

It has to happen someday, and the sooner the better. Users of computers and peripherals of every OEM are bound to revolt someday against the difficulties involved in communicating between different — and often the same — manufacturers.

A case in point: I want to install an IBM 5285 for use as a key-to-diskette data entry device and connect it to our Burroughs Corp. B1726 mainframe. But the 5285 can communicate only in bi-synchronous mode. Our little computer only has two ports available: one is handling our hard-cabled local Burroughs terminals in an asynchronous mode; the other serves a remote terminal via a local-area data set, using the synchronous protocol.

I may yet be able to install the 5285, but only if I can switch the remote terminal and the Lads unit to bisynch and swap our existing synchronous communications adapter for one capable of handling bisynch from both a remote and a hard-cabled source at the same time.

This is a ridiculous situation for any DP manager to have to put up with; yet I know that my little problem is both mirrored and magnified in DP shops around the nation. One suspects the OEM's of protecting their own turf by the proliferation of communications protocols, not to mention Systems Network Architecture, Signal Data Link Control, Communications Network Architecture and who knows how many other network architectures they have devised.

Years ago the federal government, fed up with different programming languages for different computers,

brought about a common language that would more or less be usable on any computer. It is time for a similar effort to be made in the area of data transmission.

In a recent article you quoted Woody Collins as saying, "Because the various telephone companies have pretty much standardized communications and agreed to a standard protocol, it is

possible to pick up your phone and dial anywhere in the world" [CW, Sept. 28]. If I may borrow Collin's analogy, I submit it's high time the computer industry did the same.

I wonder how many other management information systems directors, DP managers and the like share my belief that it's time for us users to demand from the OEM's a

standard communications protocol so that we can base our procurement decisions solely upon the cost/performance merits of an item and not find our options narrowed because of communications limitations.

Thomas H. Hudson  
Assistant Director  
Information Systems  
Idaho Supreme Court  
Boise, Idaho

## Designer Genes

So the DP world is in danger because not enough software designers will be available to meet the expected demand in the next decade [CW, Oct. 12]. We must begin immediately to breed more of this rare and valuable type of person.

Call in the biological engineers: We need more designer genes.

Rich Olcott  
Software Analyst  
Schering-Plough Corp.  
Memphis, Tenn.

# LETTERS

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# Data Management for the End User

(Continued from Page 41)

In the report generation area, one can employ either screen or printer for selected output from the retrieved records. PFS will even provide simple reports in free format, including field selection and page control. This capability, for example, can be used to generate mailing labels.

PFS:Report enhances the output capacity of the system by producing tables with up

to nine columns and allowing for two levels of sort. The "user-nice" features of table centering, column header aliases, ad hoc titles, pagination and paper control are handled like big system report generators. One can even derive up to three new variables as a function of already defined entities. Summaries include total, average and count, as well as one level of subtotals, subaverages

and subcounting. Given the ability to control the paper in terms of lines, width, selected breaks and paper type, one has enormous options at his fingertips.

So far, our description of PFS has been in terms of the usual computer vernacular. PFS, however, introduces itself to the user through documentation that never employs the typical jargon of our trade. Rather, the term

"form" is utilized to suggest a concept that is presumably better understood by end users than is the term "record." Screens, screen painting and file definition are replaced by the more familiar terms of "form design," which results in a "blank form." Fields are called items of a form and records are simply an instance of a filled-in form. From this point on, all explanations are easy to grasp.

In order to do real justice to evaluating a programming system such as PFS, one needs to explore its limitations and benefits by testing its usefulness in solving a real problem. For this purpose, an opportunity arose to challenge PFS. This challenge will be discussed in an ensuing column.

*Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.*

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## LETTERS

### Apples and Chevys

In "Can't Compare CNA, SNA, NCR Tells Users" [CW, Sept. 28], I was quoted as having said that comparing NCR's Communications Network Architecture (CNA) to IBM's Systems Network Architecture (SNA) was like comparing "apples to Chevy pickups." The quotation is correct, but the article's conclusion that this was "the message" I delivered to the Comten Users Exchange conference in Seattle on Sept. 22 was absolutely wrong.

I used this colorful analogy to emphasize that CNA encompasses SNA and adopts SNA formats, protocols and terminology when functioning in an SNA environment. For this reason, I explained that it was not meaningful to compare the two architectures.

The main theme of my presentation, however, was not comparability. Instead, it was to show that CNA allows users to choose among SNA and non-SNA implementations, products and services that best meet their needs.

Gary R. Van Tassel  
Manager  
Communications  
Architecture

NCR Comten, Inc.  
St. Paul, Minn.

### Situation Solved

Regarding the article on the programmer personnel shortage, "Designer Shortfall to Plague '80s" [CW, Oct. 12], our company also was faced with a similar situation a while back.

A short-run solution was to enter into a cooperative work/study program with two of the local universities. As the students graduate, this will provide us with a resource for hiring full-time programmers that already know our system and mode of operation.

Rick Klopfer  
Technical Support  
Administrator

Ledex, Inc.  
Vandalia, Ohio

## Raytheon Gives Programmers Tool to Develop Cobol Application

BURLINGTON, Mass. — Raytheon Computer Services, a division of Raytheon Service Co., announced the Readycode application development and support facility for Cobol programmers, which includes a program logic structures and code library.

Also unveiled was Recycle, a program refurbishment system.

The Readycode facility essentially provides proprietary software tools, professional staff time and mainframe resources at the vendor's facilities in the New England and Chicago area to assist commercial DP users in developing and maintaining application software written in Cobol.

Designed to increase programmer productivity, the service offers primarily IBM MVS users development and support tools without the need for training internal staff in their use.

The Readycode library consists of both program logic structures for standard types of application programs and pre-written Cobol code modules. According to Raytheon, the library of reusable code modules and program logic structures can

(Continued on Page 48)

## 'O-W-L' Now Runs On-Line At MVS Sites, Too

ATLANTA — Quanex Management Sciences, Inc. has converted its on-line program maintenance package for IBM MVS environments.

O-W-L reportedly functions as a CICS application to improve programmer productivity. The package is said to provide audit trail and security facilities, a conversational procedure language, editing capabilities and on-line partitioned data set support.

Also included in this version is the ability to concatenate, or stack, commands for commonly executed sequences of events, the vendor said, which contributes to standardization methods.

The O-W-L package also runs under IBM's OS/VS1, DOS/VS and VSE operating systems. The new MVS version carries an introductory price of \$19,700 and several lease plans also are available.

Quanex Management Sciences is located at 3720 Longview Drive, Atlanta, Ga. 30341.

## 'PMO' Boosts Performance Of MVS, VS1

PITTSBURGH, Pa. — Duquesne Systems, Inc. announced the Program Management Optimizer (PMO), which it described as a performance enhancement for any IBM MVS or VS1 installation.

Also unveiled was a new release of its performance measurement and capacity management facility, Quantitative Computer Management (QCM) III, for IBM and plug-compatible mainframes running under the MVS operating system.

PMO reportedly replaces IBM's static Resident BLDL List with a "managed" list. It is said to monitor the BLDL activity that occurs and to keep the most active link-list directory entries in storage.

A result of using PMO is a reduction in the elapsed time of batch jobs and on-line transactions, the vendor claimed. It was designed to reduce I/O contention to critical system data sets. PMO produces both a hard-copy and on-line display of performance improvement statistics.

The vendor said that QCM, with its product line of Systems Performance Module, Systems Performance Interrogator and the Job Analysis and Billing system, now contains major enhancements and additional functional capabilities. Chief among these are the elimination of all system modifications required to install QCM, the vendor said. In coordination with this, a new load module installation is possible, according to Duquesne.

Included in the installation process, the vendor explained, is a dynamically built table for I/O configurations and support for the IBM 3880 storage control units.

PMO costs \$4,000 for the first CPU, with multiple CPU and multisite discounts available. Maintenance is an additional 15% per year. The pricing for QCM III starts at \$12,000, the vendor said from Two Allegheny Center, Pittsburgh, Pa. 15212.

## ADR's Latest 'Datadictionary' Continues Move to Integration

PRINCETON, N.J. — Release 2.3 of its Datadictionary, which reportedly contains new features for both the product's batch and on-line versions and for its further integration with other Applied Data Research, Inc. (ADR) products, was announced here by ADR.

On-line users have gained an on-line interactive updating capability, the vendor said, noting the on-line system can be menu-driven and also includes an extended command set to enable the experienced user to process more directly with Datadictionary.

Users reportedly can add new entity occurrences, update or delete existing occurrences in "test" status. The user can also manage relationships, aliases and descriptors on one screen, the vendor added.

A technique called Qlist was designed to allow a list of field entities to be managed on one physical screen. It also may be applied to maintenance for record, key and element entities, the vendor explained.

The on-line version of the package in Release 2.3 is said to support user-defined extensions the same way it supports stan-

dard and optional entries. Datadictionary On-line will perform interactive update functions operating in conjunction with its Datacom/DC and Roscoe or IBM's CICS, the vendor continued.

The permanent license price of Datadictionary Release 2.3 is \$26,000 for OS versions and \$22,500 for DOS versions, ADR said from CN-8, Rt. 206 and Orchard Road, Princeton, N.J. 08540.

## VAX Manufacturing Tool Out

MERRIMACK, N.H. — Digital Equipment Corp. announced here an interactive manufacturing management package for its VAX-11/750 and 11/780 supermini-computers. Called the VAX Manufacturing Control System (VMCS), the package consists of inventory control, manufacturing standards, purchasing, material requirements planning, capacity requirements planning and shop floor control software modules.

The vendor explained that in a typical VMCS application, a production control-

ler on the floor of a manufacturing facility can receive scheduled work load, current order status and work center status reports automatically or on demand.

If new purchase orders are introduced, the production controller can use the system's modeling capabilities to assess the impact of new orders on schedules and work center capacity prior to releasing the orders, the vendor continued.

A plant manager can access VMCS on a remote terminal to build projected sched-

(Continued on Page 48)

# CICS 1.5 UMAX!

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WT18

# Raytheon Announces 'Readycode,' 'Recycle'

(Continued from Page 47)

cut coding and testing time by up to 80%. It reportedly interfaces with Applied Data Research, Inc.'s Librarian and Pansophic Systems, Inc.'s Panvalet packages.

The facility itself includes a management subsystem designed to cross-index reusable code modules so that they can be located, used and maintained. It also provides automatic reports on the number of lines of reusable and application-specific code contained in each program.

Complementing Readycode is the program refurbishment system, which was designed to extend the useful life and value of older Cobol application programs by standardiz-

ing their structures and making them easier to maintain and use.

## Batch Basis

Recycle uses proprietary software to edit a client's Cobol source modules on a batch basis. The procedures used in the refurbishment are parameter-driven, making them adaptable to the needs of a particular user, the vendor explained.

A number of predefined standards and conventions also are set up as default options, Raytheon said. Data division and procedure division code, for example, is restructured into a columnar format. Procedure division sections are separately indexed and procedure division paragraphs are assigned numeric prefixes.

The refurbishment cost is based on a per program basis, at an average of \$500 to refurbish a 5,000-line program, according to the vendor.

The first Readycode centers opened in September at Raytheon headquarters in Burlington, Mass., and in Chicago. The cost of applications development with the Readycode facility, from design through system test, ranges from 50 cent/line to \$2/line of code, depending upon the com-

plexity of the application, the vendor said.

Costs for use of the Readycode application development and support facility are estimated on a per project basis, the vendor said. A program of average size, approximately 2,000 lines of code, will cost approximately \$800, according to the vendor.

Raytheon Computer Services can be contacted at P.O. Box 503, 99 S. Bedford St., Burlington, Mass. 01803.

## Manufacturing Tool Fits VAX-11

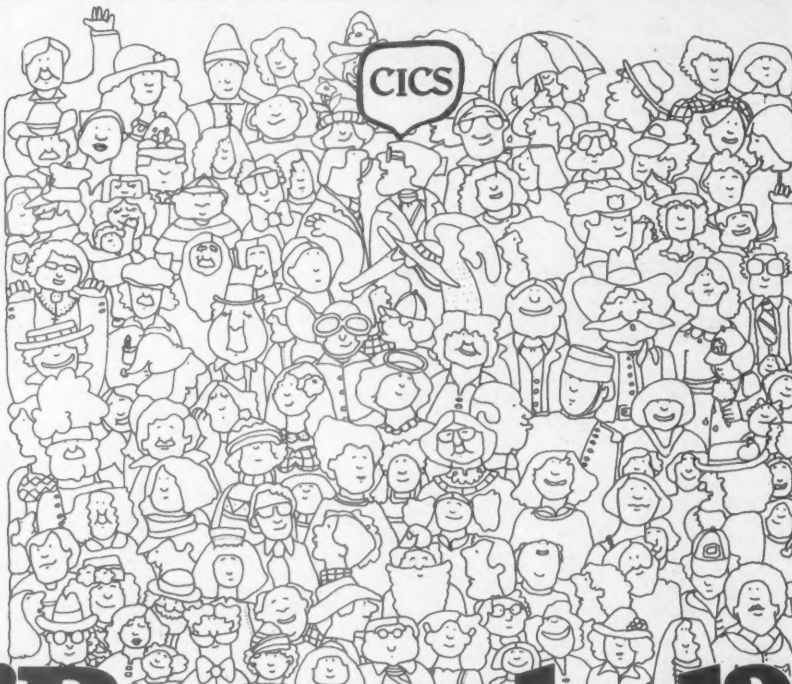
(Continued from Page 48)

ules and master production plans and to test the plans through simulation, according to DEC. Once a manufacturing model has been opti-

mized, the data is fed into the inventory control and shop floor control modules for use in ordering materials and controlling the manufacturing process.

The material requirements module lets users calculate all material requirements, project cash flow needs, optimize manufacturing plans and recommend material replenishment orders, the vendor said. All inventory requirements generated by this module reportedly are managed by the inventory control module.

Shop floor control software provides factory personnel with a means of tracking orders, reporting labor and scheduling work centers, the vendor explained. A typical VMCS software configuration averages \$150,000 and deliveries are scheduled for spring 1982. DEC is headquartered in Maynard, Mass. 01754.



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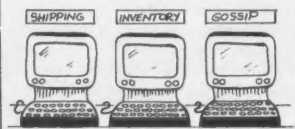
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## 'Cortex' Package Accomplishes IBM DOS-to-OS Conversions

LOS ANGELES — United Software Systems and Services Corp. introduced in the U.S. its Cortex package, which is designed to handle IBM DOS-to-OS conversions. Cortex reportedly works on the entire application, with programs and JCL embedded. Customization can then be added using the Universal Control Language, which is directly processed by Cortex, the vendor said.

The generated JCL is guaranteed 100% error-free, the vendor explained, noting that this guarantee is good for one year and one month so all programs can be tested. The guarantee is given in writing in the contract.

After the conversion is completed, the user can regenerate an optimized and homogeneous JCL at any time, the vendor explained.

Cortex reportedly can convert any language, including

Cobol, Assembler and Fortran and also some software packages. It reportedly handles the data automatically and can be customized, the vendor said.

The preliminary study and license fee is \$16,000. Automation of the generator to incorporate the applications workbook formulated during the first stage ranges

from \$10,000 to \$50,000, depending upon the customization required. The license fee for the Cortex products is \$46,000.

A typical pricing structure for a conversion involving 1,500 programs is \$480,000, according to the vendor from Suite 1136, 1801 Ave. of the Stars, Los Angeles, Calif. 90067.

## 'TWO' Converts JCL to TSO

WABAN, Mass. — Tanit Software Services Co. announced the first release of a package called TWO, which reportedly converts IBM OS JCL to TSO command procedures, as well as TSO to JCL.

TWO was designed to convert JCL DD and Exec statements and TSO Attrib, Allocate and Call commands. More than half of the parameters and their associated subparameters are convertible, the vendor said. Included in the output are an error report and an optional cross-reference listing.

The software is being offered on a six-month-lease basis for \$1,750. A 30-day trial period also is available for \$200, which is refundable toward the six-month lease, the vendor said from P.O. Box 191, Waban, Mass. 02168.

## Service Shares DP Resources On East Coast

LIONVILLE, Pa. — A service that gives East Coast users of IBM and plug-compatible equipment shared-computer resources, as well as the assistance of systems programmers and software support, is being offered by Carta Associates, Inc. here.

System-Level Support Plus 1 (SLS Plus 1) is a service that enables client companies to utilize the personnel, hardware and software resources of the Carta Data Center and its IBM 4300.

The service essentially represents a cross between a time-sharing service and facilities' management, according to the vendor.

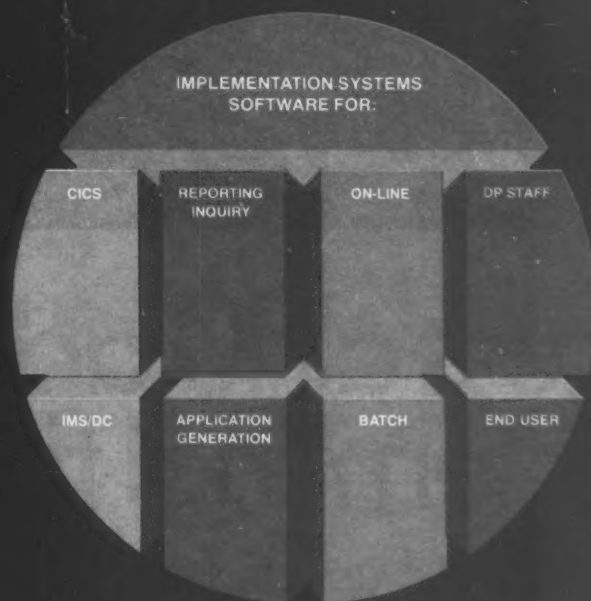
The client processes his own applications at his location, the vendor explained, and the Carta system support team ensures the availability of the IBM system's computing capability.

Carta's systems-level programming staff, together with specialists in communications, data base and on-line systems, are available to clients, the vendor explained.

### Monthly Fee

The SLS Plus 1 client pays a fixed monthly fee, based on the amount of the resources needed as well as the configuration.

A no-cost feasibility survey is a necessary prerequisite to SLS Plus 1 to enable the vendor to become acquainted with the client's operation and understand projected requirements, Carta said from 325 Gordon Drive, Lionville, Pa. 19353.



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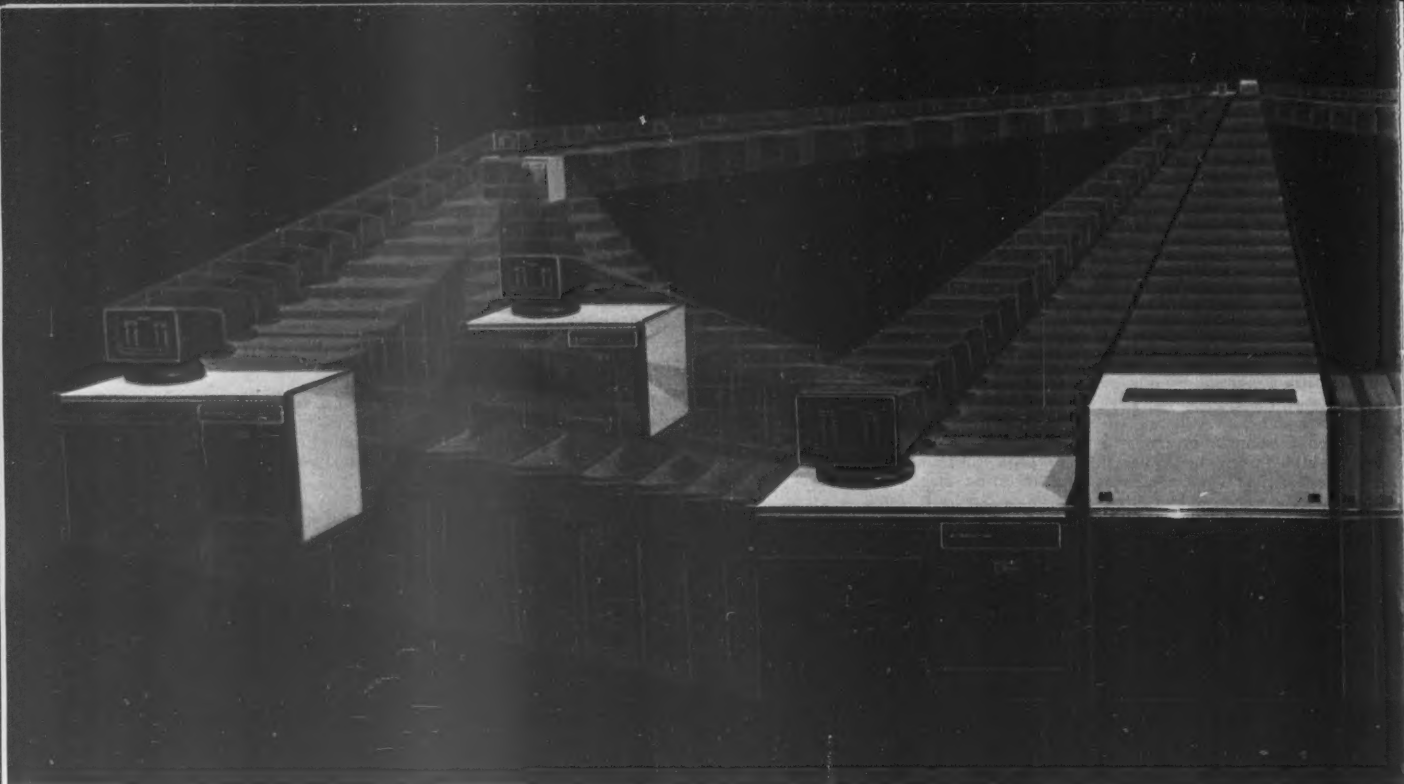
Our software productivity tools are the key. Programmers can write single source statements which replace up to ten lines of 'lower level' COBOL. Also, our terminal-oriented productivity tools allow end users to generate their own queries and special reports — further reducing your backlog, but without any loss of security or resource control.

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## Package Equips DEC Processors For Medical Uses

MIAMI — A medical software package coded in Ansi Cobol using structured coding techniques and said to run on Digital Equipment Corp.'s Decsystem-20 Models 2020, 2040, 2060 and Decsystem-10 processors has been announced by RVR Data Service, Inc.

PDS is designed for clinics, group practices and medical laboratories, and provides control over patient billing, accounts receivable and preparation of insurance either on forms or electronic claims to coincide with Medicare's preferred paperless claims, the vendor said.

The package generates management reports and edits and validates service codes at point-of-entry to free the host CPU, the company claimed.

PDS is priced between \$50,000 and \$70,000 depending on options selected from RVR Data Service, Inc., 3900 N.W. 79 Ave., Miami, Fla. 33166.

## Accounting Package Gets 10% Discount

MARINA DEL REY, Calif. — International Management Systems Corp. is offering discounts of 10% on its financial reporting/general ledger, fixed assets or accounts payable packages for the IBM System/3, System/34 and System/38 ordered before Jan. 1.

Prices for each package range from \$4,000 to \$8,500 from the vendor at Suite 217, 4676 Admiralty Way, Marina del Rey, Calif. 90291.

## Export Packages Run on PDP-11

TORRANCE, Calif. — A series of packages for the export industry that run on Digital Equipment Corp. PDP-11 processors has been announced by Milestone Computer Systems, Inc.

Software modules include a quotation package, order processing, factory purchase orders, inventory control and standard accounting packages. The modules generate sales history reports to analyze sales by territory, customers, products or salesmen, the vendor claimed.

A single CPU license costs between \$15,000 to \$25,000, depending on modules selected from Milestone, 19401 S. Vermont Ave., Torrance, Calif. 90502.

## Math, Stat Packages Cut Program Time, Code Lines

HOUSTON — Two software packages for math and statistics said to reduce programming time by more than 95% and reduce lines of code by more than 90% — compared with Fortran programs — have been announced by International Mathematical and Statistical Libraries (IMSL), Inc.

Math/Protran is a problem-solving tool that allows users to perform approximation and smoothing, data fitting, differentiation, fast Fourier transforms and to solve linear systems of equations, IMSL said.

Stat/Protran is an analysis package that provides data management capabilities and covers a wide range of

applications to meet statistical needs such as frequency and cross tabulation, correlation and random number generation, the vendor claimed.

The packages run on IBM 360, 370, 30 series and 4300 processors; the Control Data Corp. 6000, 7000 and Cyber 70/170 series CPUs; and on Digital Equipment Corp. VAX-11 and Decsystem-10 and -20 computers.

Math/Protran leases at \$3,000/year with a \$2,000 annual renewal. Stat/Protran leases at \$2,500/year with a \$1,500 renewal from International Mathematical and Statistical Libraries, Inc., NBC Building, 7500 Bellaire Blvd., Houston, Texas 77036.

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## Correction

The price of Prime Factors, Inc.'s Descrypt ["File-Oriented 'Psypher' Adds NBS Data Encryption Standard," CW, Oct. 5] ranges from \$1,500 (not \$15,000) for mainframes to \$600 for minicomputers.

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## Why Buy a Package?

Make or buy?

With software development costs rising ever higher and the supply of experienced programmers becoming ever scarcer, the scales are tipping in favor of buying packaged software.

Computerworld will be publishing a Special Report on Applications Packages in January, and we want to know how your installation is dealing with decisions regarding packages. Tell us about the ones you have purchased and why you selected them. Explain what motivated you to shop outside for software and how the packages are working within your organization. Have they really proven less

expensive than software developed in-house — and by how much?

Describe how much customization is required with application packages. Have they relieved some of the pressure caused by shortages of DP personnel? Enabled you to make better use of your hardware? Led to changes in equipment?

Please send your experiences and viewpoints (typed, double-spaced and no longer than six pages) by Dec. 4 to Lois Paul, Senior Writer/Software, Computerworld, P.O. Box 880, Framingham, Mass. 01701. Accompanying graphics are welcome.

## 'Rams' Offered as Addition To Existing CICS Networks

INDIANAPOLIS — A Resident Automated Message System (Rams) for IBM and plug-compatible equipment operating in OS, VS/MVS and DOS/VSE environments was introduced here by Integrated Teleprocessing Systems, Inc.

Rams was described by the vendor as a natural addition to an existing CICS network. It reportedly provides a means of sending messages, via the teleprocessing network, to as many as 1,000 locations with a single entry.

The primary features are free-form or custom-formatted messages that are time-stamped when sent and received, the vendor said. All messages reportedly are password-protected

and can be selectively routed to single, multiple or all locations simultaneously.

In addition, the software can re-print messages, transmit user reports and retain historical files of all messages created, according to the vendor.

Available immediately, Rams sells for \$15,000, including an operating manual and installation and planning guide.

The vendor can be contacted through P.O. Box 68621, Indianapolis, Ind. 46268.

## 'MC/1' Expands Mapics System

NEEDHAM, Mass. — A purchasing and receiving module said to expand the capability of the IBM Manufacturing and Accounting Production Information Control System (Mapics) for System/34 users has been announced by Marcam Data Systems Corp.

MC/1 prints purchase orders and tracks them from the reporting of initial purchase requirements through printing of orders, receipt of goods and purchase order close-out, the vendor claimed.

The module is said to exceed standard Mapics capabilities by providing tracking of actual quantities at the receiving dock and during inspection, rejection, stock, scrap and return-to-vendor activities.

For operational planning, the module generates detailed reports on receiving functions, material planning requirements, purchase cash flow, material requisitions and approved vendor parts lists, the vendor said.

MC/1 is available on diskette and is priced at \$6,000 from Marcam Data Systems Corp., 109 Highland Ave., Needham, Mass. 02194.

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corporate headquarters in Atlanta. Development, for example, is a high priority. This year alone, we will spend more than \$17 million to enhance and improve our application packages. This investment exceeds total revenues of many of our key competitors.

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For NCR, Century, Criterion Users

## Commercial Data Offers Three Packages

FORT LAUDERDALE, Fla. — Three software packages for users of NCR Corp., Century Computer Corp. and Criterion Consolidated Corp. computers have been announced by Commercial Data Corp.

Doc provides the advantages of word processing, using the users' text editor and eliminating the need for training, according to the company.

Supdir combines the directories from any number of packs and consolidates them into a single directory sorted alphabetically by file name, generation number, file type and disk pack number, the vendor claimed.

Dfud is a disk file usage directory

offering a cross-reference report of the programs that use a given file showing the program language and file size, the company claimed.

Doc, Supdir and Dfud are priced at \$1,500 each from Commercial Data Corp., 5100 N.W. 9 Ave., Fort Lauderdale, Fla. 33309.

## Documentation Aid Fits System/34

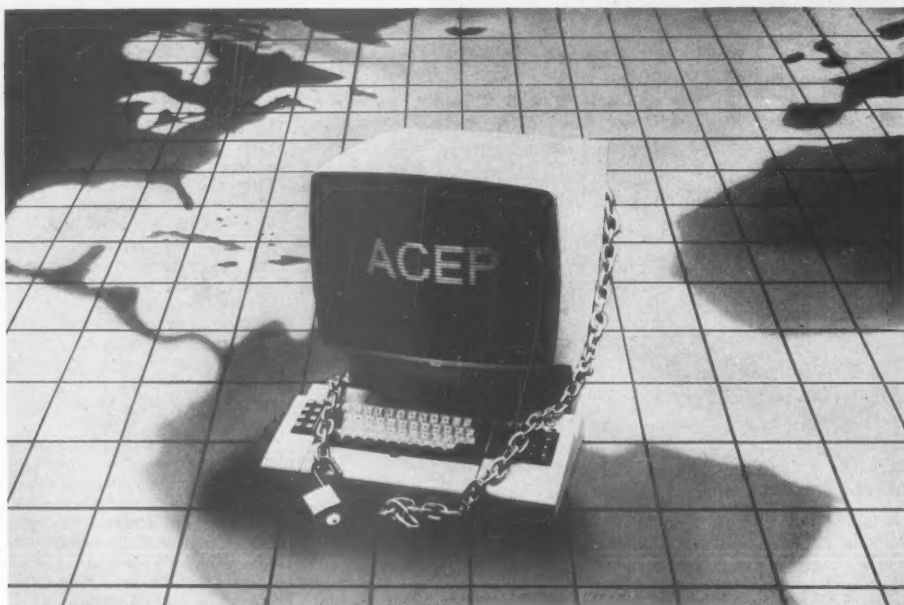
NEW YORK — A documentation package said to produce integrated reports for up to 30 different libraries for IBM System/34 minicomputer users has been announced by REM Associates, data processing consultants.

Remdoc requires no prior knowledge of library contents and automatically identifies various source member types while retrieving external modules, even if they are in different libraries, the company

claimed.

The package also includes printer and screen layouts, a data dictionary, file/field and file name-label cross references and a nested procedure explosion, according to REM Associates.

Remdoc is priced at \$2,500 including installation support, maintenance and future upgrades from REM Associates, 704 Washington St., New York, N.Y. 10014.



## Installations everywhere are finding a way to unlock programmer productivity.

ACEP is the personal computing system that was specifically developed for IBM virtual memory control programs (VS1 and MVS). This system makes it possible to enjoy increased on-line productivity while using only a fraction of the resources required by older time sharing systems.

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preferred locations. Additionally, users can check both job and system status by reviewing items such as: job queue, system catalog, library contents and other significant information. Users have their own libraries and multiple working areas. There are no JCL restrictions and data sets can be dynamically allocated.

### Installation Benefits

Installations using ACEP benefit from its efficiency, simplicity and security. The system is so logical and straightforward that it is easy to install and easy to use. ACEP does not require modification of operating system routines and most programmers have it up and running in just half a day. Additionally, data access and

command execution can be restricted at the user level.

ACEP, which has a constantly active "hotreader" for the VS1 system, interfaces to several source program maintenance systems and can be accessed through VTAM, BTAM, TCAM or existing CICS or Intercomm terminals.

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## Burroughs CPUs Gain Family Of Packages

TALLAHASSEE, Fla. — ESI, Inc. has announced a family of environmental software for Burroughs Corp. medium-size systems.

The integrated Plus Family consists of five major systems: Pro Plus on-line programming system; Security Plus with full audit ability; Lion Plus tape management system; Job Flow Plus job and resource management system; and Remote Print Plus, handling remote reporting requirements.

The integrated system is said to allow the memory manager module and controller to handle all memory management and intercommunications tasks for all other Plus Family members.

Syntax for all commands for Plus Family members is available in the Plus Family syntax file, the vendor said.

Plus Family components range in price from \$2,500 to \$9,600 for initial license fee, depending on configuration. Package prices and lease plans are available from ESI, 1801 S. Gadsden St., Tallahassee, Fla. 32301.

## Bank Tool Bows For System/34

NEWBURGH, N.Y. — A banking package designed for use by small- to medium-size banks that runs on an IBM System/34 computer was announced here by George Matyjewicz & Co., Inc.

Among the applications offered are savings, securities reporting, demand deposit accounting, stock ledger accounting, mortgage participation, installment loans and general ledger. Also included are applications for commercial loans, safe deposit box accounting, FHA actuarial, Now accounts, student loan reporting, payroll, IRAs, certificates of deposits and overdraft banking.

The vendor said it provides customer installation of the software package, as well as a "hot line" for user questions that can be handled by in-house professionals manning a System/34.

The entire package is priced at \$40,000, the vendor said from 247 N. Plank Road, Newburgh, N.Y. 12550.

## System/34 Gets Financial Tool

ROCKPORT, Mass. — A financial and accounting modeling package, designed for the IBM System/34, has been announced by Para Research, Inc.

Paracalc allows users to plan and calculate budgets, analyze cash flow and track inventory, the company said. By designing models on the screen, a user can perform any combination of math operations including string processing, exponents and square roots, according to the company.

Paracalc is priced at \$500 from Para Research, Inc., Whistlestop Malls, Rockport, Mass. 01966.





**IN DEPTH**

## THE NUTS & BOLTS OF **CAPACITY PLANNING**

AS THE DATA PROCESSING INDUSTRY HAS MATURED, COMPUTER installation managers have become increasingly aware that growth and change are facts of life: Cheaper, faster, more reliable hardware becomes available; new software applications replace outmoded ones (and, unfortunately, even those that aren't); and service demands increase as business expands and as additional departments move to automate their tasks.

One consequence of change is the often troublesome task of upgrading a computer installation. If the upgrade takes place months (or, as in some cases, years) after the system has been intolerably overloaded with work, the damage to a company's business and to users' morale can be serious. But the growth of a system need not be an arduous process, punctuated by angry user complaints. An installation manager with the foresight to anticipate growing demands, to estimate the operating characteristics of new software and to order new equipment with generous delivery-time allowances can ensure that the system matures gracefully.

Though these activities have often been performed independently (and haphazardly), a discipline called "capacity planning" has emerged in recent years to coordinate and centralize them. Many of the nation's leading companies have enjoyed success with capacity planning:

- Chemical Bank has used planning tools to help design Chemnet, a large-scale network that will integrate a broad spectrum of banking and investment functions.
- First National Bank of Boston has conducted a planning study to en-

**BY JOHN J. POSNER**

## IN DEPTH

sure the satisfactory performance of its growing set of automated teller machines (ATM).

- Utah Power and Light Co. saved thousands of dollars per month by deferring delivery of a new main-frame computer before it was needed to maintain satisfactory service levels.

- Many other major corporations, including General Motors Corp., United Airlines, John Hancock Insurance and organizations in com-

munications, computer services, government and banking have reaped the benefits of planning their data processing capacity.

A sure sign that capacity planning has "arrived" is the emergence of professional organizations such as the Computer Measurement Group (CMG), the European Computer Measurement Association ((Ecoma) and the Computer Performance Evaluation Users Group (Cpeug), that focus much of their attention on devel-

opments in this area. Each year, a number of international conferences convene to discuss planning issues, and many users group meetings (Share, Guide, Use and others) feature sessions on planning. Several computer industry publications (notably the *IBM Systems Journal* and *Applied Computer Research, Inc.'s EDP Performance Review*) have devoted entire issues to capacity planning. And even *Business Week* has published an article on this subject, bringing ca-

capacity planning to the attention of top corporate management.

This article presents an overview of the issues and tasks that confront the installation manager, system analyst or planning analyst whose job is to plan (and implement) growth in multiuser data processing systems.

## Principal Issues

As in so many aspects of business life, a planner must strike an effective balance. For the capacity planner, we can summarize the two factors to be balanced as follows:

- Computer system users desire rapid service (response time) and enough power to process work loads within given deadlines (throughput).

- Business managers want computer equipment, like other equipment, to be used efficiently with minimum excess capacity. They wish to spend as few dollars as possible in order to get users' jobs done.

To strike the balance, the capacity planner must make well-considered decisions or recommendations regarding the basic upgrading questions: "When should we upgrade the system hardware?", "What equipment should we buy and how much of it?" and "When should new application software and/or system software be installed?"

If the planner succeeds, the benefits are many. System users enjoy good response time and throughput levels as the system grows. To the extent that it depends on computer performance, employee efficiency is maximized. The company spends its capital investment dollars well, since the hardware acquired is the right equipment at the right time.

## Whose Job?

In general, capacity planners have been recruited from the ranks of installation managers and systems programmers. In fact, in many installations there is still no separate "capacity planning" position — planning is part-time work for a system manager or programmer.

The successful planner brings to the job expertise in several areas.

- *Knowledge of the Operating Environment(s).* How the operating system uses hardware resources; how major application and communications subsystems use these resources.

- *Knowledge of the Work Loads.* How demand for service varies over time-of-day, time-of-month and so on; how different types of users (data entry clerks, programmers, auditors) and different software systems (time-sharing, batch, data communications) make varying service demands.

- *Knowledge of the Business.* This is where "back-room guys" may find they are handicapped, unless they can develop effective communications links with other departments. The planner must be able to obtain reliable information that indicates how the company's data processing

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## IN DEPTH

demand profile will change: increases in order entry transactions, mushrooming compilation requests as a major software deadline approaches, addition of new batch jobs when a direct-mail application is installed and so on. Thus, it is important for the planner to have or develop the person-to-person communications skills that will enable him to collect the information necessary for knowledgeable forecasting.

**What's Involved?**

Now we examine the more substantial issues. What do the planners actually do? The tasks may be grouped into several general areas:

First, the planner must devise a concise description of the computer system, as it is currently used. This description encompasses hardware and software, of course, but it also must account for "work loads," the rates at which these resources are used by the people working with them.

Hardware descriptions are obtainable from manufacturers' specifications and installation configuration documents. Since the planner is interested in the performance characteristics of hardware components, the specifications may be supplemented and validated with measurement data provided by hardware monitors.

Determining the software/work load description of the system is a demanding task, requiring good judgment as well as good data. Of course, computer system activity encompasses an extremely complex series of events. To impose structure in this situation, planners usually regard system activity as being organized into "transactions" or "jobs." A single transaction might be:

- Entering a line of source code.
- Entering a customer's order into an on-line data file.
- Sorting a master customer list by Zip Code.
- Compiling a complete Cobol program.

As these examples suggest, the transactions being processed by the system may vary greatly in size. To further simplify the software/work load description, planners often group transactions by type, hoping to define homogeneous groupings. Ideally, all transactions in a particular group make similar demands on the system's software and hardware resources. In many installations, the system manager has already devised such groupings for use by the operating system's resource-sharing routines.

Common examples of transaction types include:

- Data base inquiries handled by a remote communications sub system.
- Programmer's interactive requests: commands to text editors and debuggers.
- Batch tests.
- Batch data base utilities: sorting,

merging, data import/export over phone lines and so on.

• Nighttime production batch (typically magnetic tape-intensive).

Part of the process of devising transaction groupings is the quantitative characterization of each group. The planner must describe accurately each group's system usage from a performance viewpoint. Typically, he determines:

1. **Transaction profile:** The demands made on system resources by

an average transaction from each group. (Alternative strategies might involve determining minimum and/or maximum demands.). For example, an average transaction in a data base inquiry/update application might make the following demands:

- a) central processor(s): 115 msec.
- b) disk with master customer list: one access of 60 msec.
- c) disk with transaction file: three accesses totaling 250 msec.
- d) tape transaction log: one access

of 20 msec.

The planner must decide whether or not the exact order of these demands is important. Ordering issues add a significant level of complexity to the analysis.

2. **Arrival process:** The way in which transactions arrive at the system. The arrival process can be described in various ways, including:

- Uniform arrival at a specified rate (n transactions per hour).
- Transactions generated by n ter-

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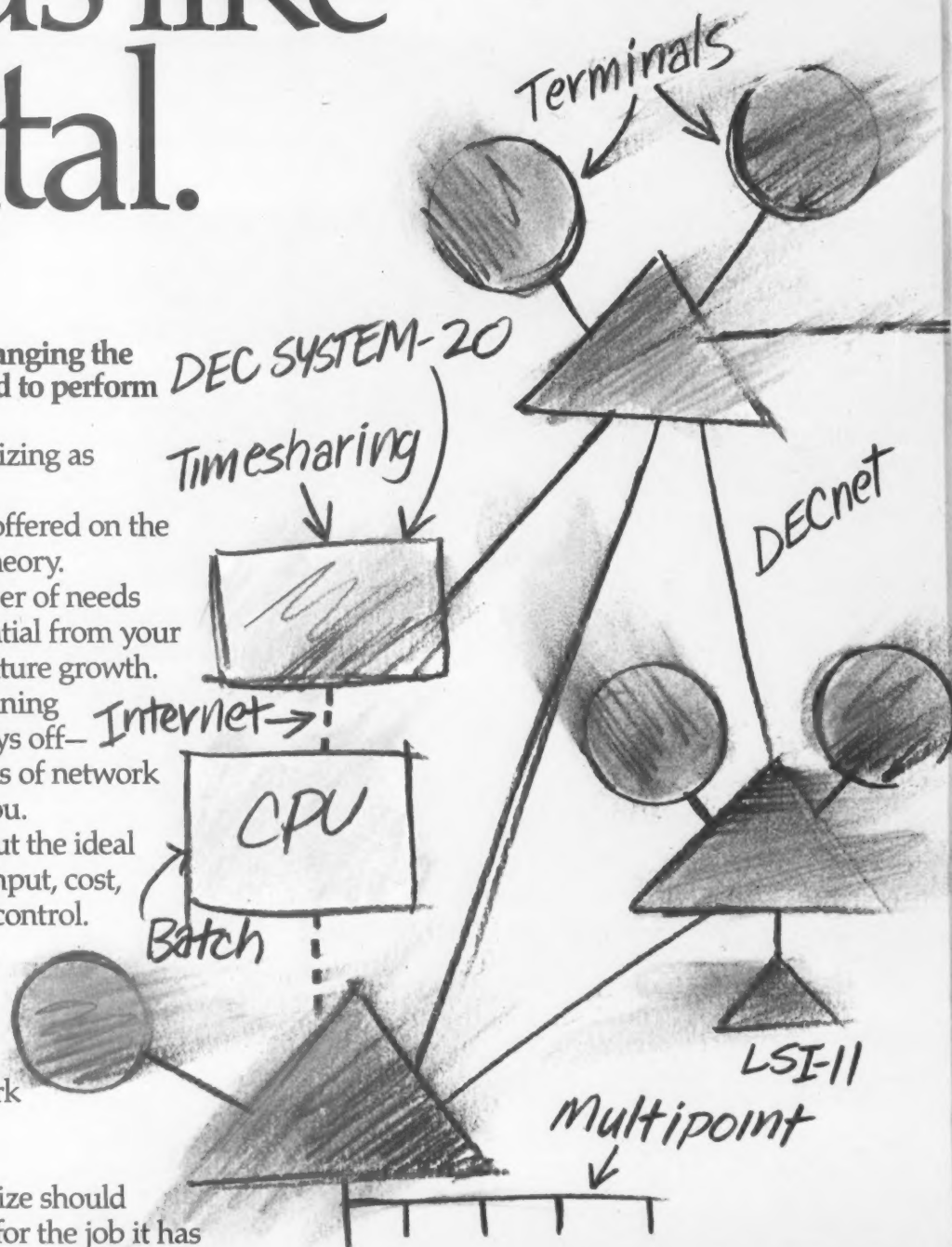
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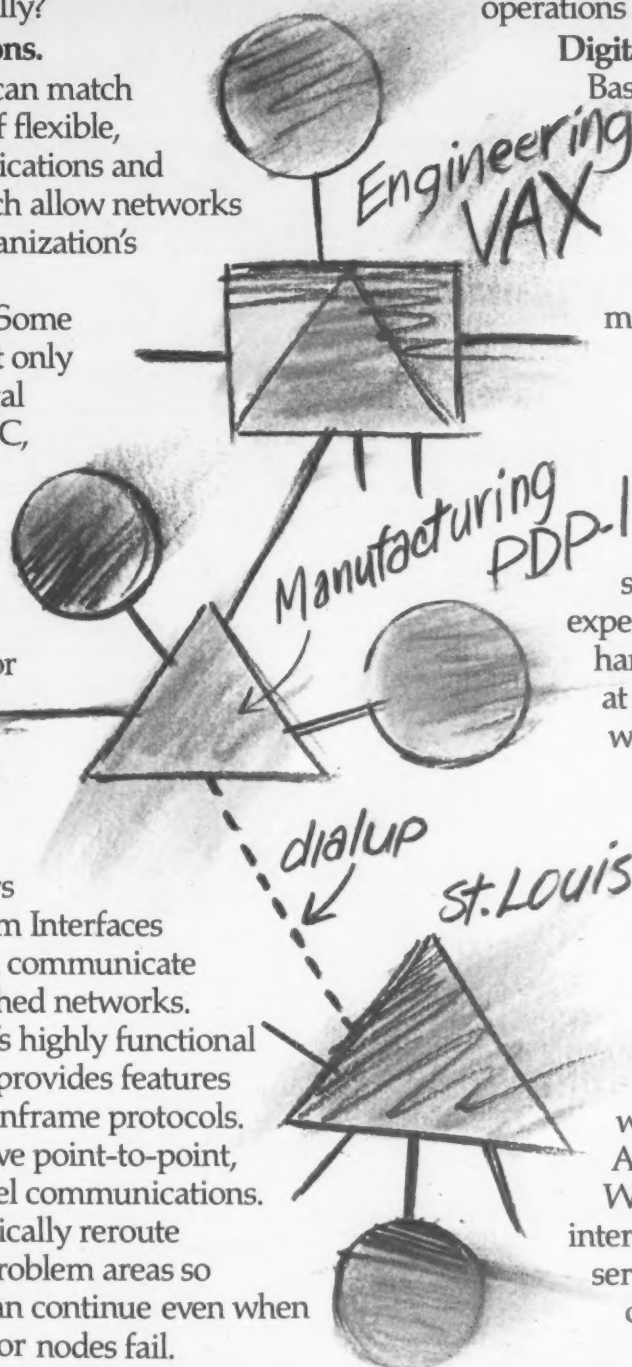
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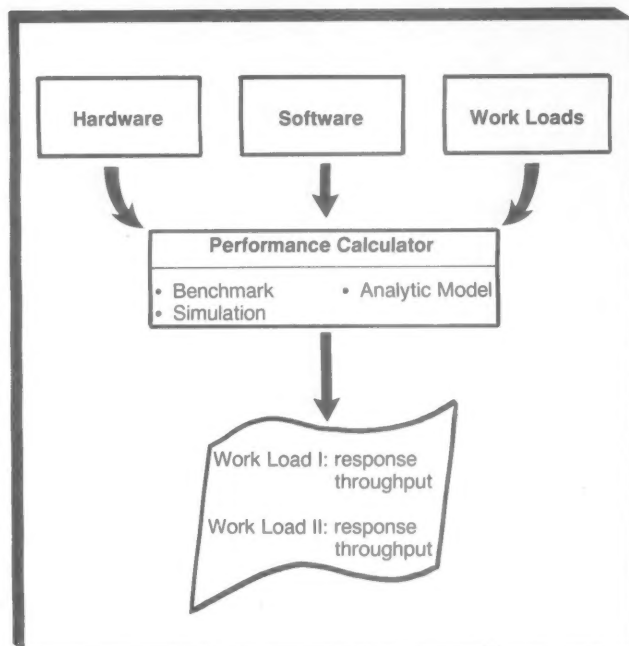


Figure 1. The Performance Calculation Process

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minals, with an average "think time" of 2 seconds between the system's response and the entering of the next transaction.

- Backlog: more transactions are always waiting, no matter how fast the system processes them.

How does the planner obtain accurate statistics on transaction and work-load demands? Experience with the hardware/software environment is very useful, of course. A knowledge of the theoretical descriptions of processing algorithms, I/O architecture, software "path lengths" and so on can contribute as well. But the main source of statistics is monitoring (measurement) programs, at both the hardware and software levels, that allow detailed reporting of system activity and resource usage.

Monitoring programs usually are vendor-supplied and gather information either for all system activity or for a major software subsystem. For hardware devices, the statistics report percent utilization over a time interval (what part of the time a device was in use). For software modules, the statistics report use counts over an interval (how many times the instruction or subroutine was executed).

Ideally, the measurement program organizes system activity into transactions and work loads in the same way as the capacity planner. (This is an area where the planner may have to compromise, if the monitor can't.) This will provide statistics on the arrival process for all work loads — numbers and time distributions for each type of transaction.

Examples of software measurement programs include SMF and RMF (IBM), SIP/PAR and Trace (Sperry Univac) and Spark (Burroughs Corp.).

#### 'Overhead' Functions

The preceding discussion has considered only the work the computer system does to fulfill specific user requests. Systems also spend a considerable amount of time and resources performing "overhead" functions, most notably those that permit several transactions to receive service concurrently: context switching, address mapping, swapping, demand paging and the like. In fact, in many time-sharing environments, the system spends more of its time doing these overhead functions than it does actually processing the users' jobs.

Getting accurate data regarding the nature and extent of this "nonproductive" activity is one of the planner's significant challenges. Again, manufacturers' descriptions provide basic information, and system measurement tools provide quantitative reports on overhead.

If the measurement tools do not do so themselves, the planner must apportion the overhead time to the various work loads, a considerable job since different types of transactions require different levels of support

from overhead functions.

In the process of gathering the statistics that characterize current system activity, the planner most likely will also learn system users' opinions regarding their satisfaction with system performance. It is very important that the planner formulate performance objectives that successfully strike the balance between users' wishes and business managers' policies. Without performance objectives, there is no way to evaluate the success of the planning process. And without realistic objectives, the planner's chances of failure are high.

Performance objectives are phrased in terms of throughput and response times. In most operating environments, it is appropriate to define different objectives for different work loads. For example, the number of batch jobs to be processed per hour will differ from the number of data base transactions. The planner should set an upper limit on the acceptable response time for an average data base transaction, but there may be no need for a corresponding limit on batch turnaround.

The fact that different performance objectives are assigned to different work loads can affect the process of defining the work loads. In some installations, all time-sharing transactions might be grouped into a simple work load with a target of 1.5-second response time. Another installation might distinguish between "short" time-sharing transactions that must be processed (on the average) in .8 seconds and "longs" that may take up to five seconds, on average. Thus, there is a feedback loop between the tasks of defining work loads and setting their performance objectives.

In a sophisticated approach, the planner may wish to formulate varying performance objectives, depending on time of month, time of day or other factors that will affect workload levels predictably. It may, for example, be possible to plan for three-second response time for data base transactions between 9 a.m. and 3 p.m. and 10-second response after 3 p.m. to allow second-shift batch jobs an early start.

#### Work-Load Forecasting

We have noted that computer system performance is a function of the hardware configuration, the system and applications software and work load levels. In general, the planner has some measure of control (either directly or through recommendations) over the hardware configuration and, to an extent, over system-level software. It is the planner's job to anticipate and predict changes in the applications software and work load areas so that hardware adjustments can be made to sustain satisfactory performance. Of course, any hardware changes made out of necessity or by an independent decision must also be taken into account.

Work-load forecasting is essentially an information-gathering and analy-



## IN DEPTH

sis process. The planner must communicate with those areas in the business that generate demand for computer resources. He must be able to interpret predictions of future business activity in terms of their data processing impact. Of course, the greater the planner's knowledge of both his company's business and the supporting computer applications, the better he will be able to translate business forecasts into work-load forecasts.

Often, forecasting is performed haphazardly, using linear extrapolation of recent trends and "finger-to-the-wind" techniques. In some cases,

*Forecasting is often performed haphazardly, using linear extrapolation or "finger-to-the-wind" techniques. With lightly loaded systems, a rough guess at the future transaction rate may be good enough. A system nearing its capacity, however, displays an exponential explosion in response times as transaction volume grows. Thus an accurate estimate of future demand may be of critical importance.*

such estimates prove entirely satisfactory, as long as sufficient cushioning factors are incorporated. But often, growth is geometric rather than linear; and in some cases, there may be no smooth mathematical function that accurately describes the changing work load.

With lightly loaded systems, even a crude guess at a future transaction rate may be good enough. A system nearing its capacity, however, displays an exponential explosion in response times as transaction volume grows. Thus, an accurate estimate of future demand may be of critical importance. There is no substitute for conscientious research and insightful analysis in order to derive the most reliable forecasts.

Future work-load levels may also depend on factors not directly attributable to changes in the level of business activity. Changing company computer-usage policies, work-load consolidation, personnel hiring and training efforts and many other factors can significantly affect demand levels.

The planner must also track software changes. Changes in system-level software can affect the amount of overhead processing to be assigned to each application transaction. Hardware changes also affect overhead levels.

Changes to applications software typically fall into two categories: conversion of existing programs and creation of new programs. The impact of converting an existing application is often quite predictable. The planner has the advantage of familiarity with the current implementa-

tion and often has the application's performance measurement data to work with. Still, even a relatively simple conversion, such as moving order entry from the batch environment to the on-line interactive environment, can alter processing requirements considerably.

The challenge of predicting the performance characteristics of new software, or applications that are still in the planning stage, is even greater. The planner must rely on esti-

mates from the application designers and his experience with (or research into) comparable software systems.

It may require a significant effort to convince designers of the need for performance estimates. Too often, applications are designed only with functionality in mind, resulting in double trouble: Eventual performance cannot be predicted in advance and then proves to be inadequate. Thus, the planner can make a valuable contribution to the develop-

ment effort by acting as the advocate for good performance throughout the design and coding stages.

Having characterized the present system and projected work-load changes, the planner must address these crucial questions:

- How will the system perform in the future?
- How and when will the hardware configuration need to grow to meet expanding demands?

A most important point is that these

## Q: "What do these people have in common?"



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Medical Center  
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"Over the years, Burroughs has provided a growth path of products that has enabled us to achieve a tenfold improvement in performance without the need for costly and wasteful expenditures for conversions. In our opinion, this is without peer in the industry."

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"Churchill Public Hospital was able to convert all financial systems to the B 80 system over a very short time period. Using already-employed staff with no computer training, we implemented the general ledger package the first month the computer was in-house. We immediately followed with payroll, then patient accounting, accounts receivable and finally accounts payable. From delivery to final system implementation, it took nine months."

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**Erika Quick**  
Manager  
Del Norte Medical Clinic  
Crescent City, California

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**G. Serangeli**  
Executive Coordinator  
Hopedale Medical Complex  
Hopedale, Illinois

"When we have had problems, Burroughs representatives have listened—carefully. Then they have recommended—competently. This was particularly true in the recent selection of a new system which is exruciatingly important to later success."

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*This MT1541 terminal, featuring "intelligent" design and light pen data entry, is part of Burroughs full line of hospital information systems.*

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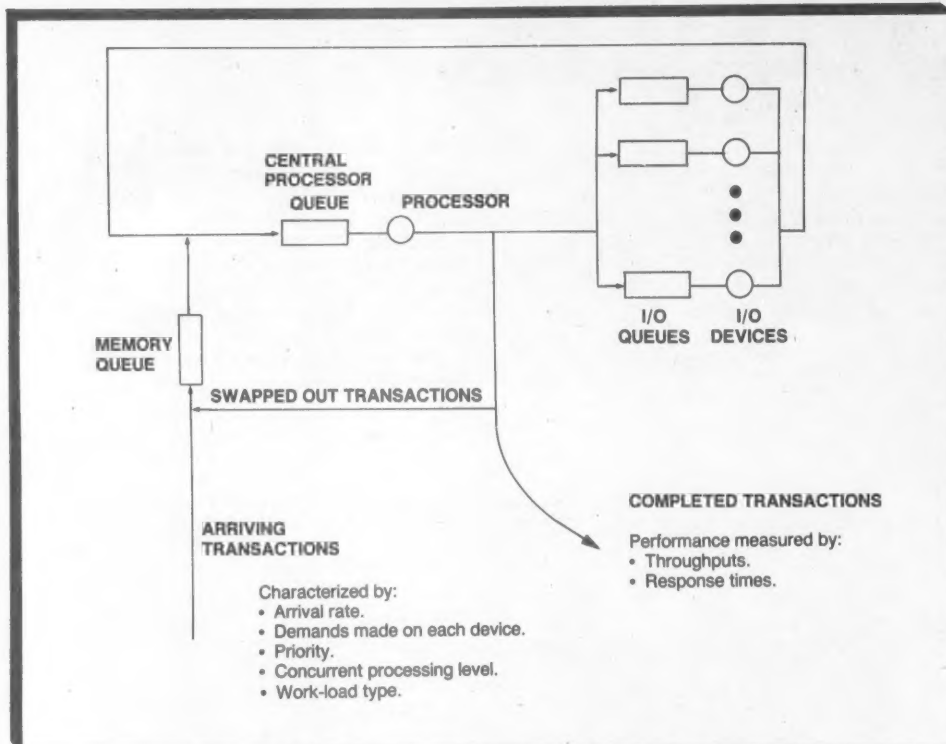


Figure 2. An Analytic (Queuing Theory) Model of a Computer System

questions must be cast in terms of quantitative performance objectives, not just in fuzzy descriptions. Only in this way can the capacity planner judge the success of the planning effort.

If "hard" numbers are required for predictions, the planner needs to calculate the response times and throughputs that indicate system performance (see Figure 1 on In Depth/6). Several performance calculation technologies are available,

ranging from old and established to new and exciting. The following sections present an overview of three widely used alternatives. Each year, the *EDP Performance Review* includes in its December issue a listing of currently available software tools for capacity planning.

**Benchmarking.** The most obvious and foolproof method of determining performance is "try and see." It also has quite limited applicability. Arranging with a hardware vendor

for a test configuration can be time-consuming and very expensive, discouraging the testing of several hardware alternatives. Typically, the vendor (rather than the planner) controls the benchmarking process, so there is no assurance that the test configuration and software operating environment truly match the planner's specifications.

Further, the planner may not be able to devise a representative work load to run on the benchmark system. An obvious case of this drawback is the problem of predicting the performance of an application that is currently unwritten.

**Simulation.** Representing the hardware and software components of a system abstractly in a simulation language circumvents the major drawbacks of benchmarking. The planner can build detailed models of both the current system and proposed future systems to perform comparison studies. The creation of a useful simulation model can be time-consuming, however, a major programming effort in its own right. Simulations run in more-than-real time — that is, a single second of actual performance may take many seconds to simulate. This slowness, along with the simulation's large demands on computer resources, inhibits the planner from performing a comparison study involving a large number of alternative configurations.

Data gathering for the simulation model can be inconvenient. Often, the standard performance measure-

ment tools used to characterize the current system don't provide data usable for simulation. In these cases, special measurement software must be implemented, further increasing time and money expenditures. And it is particularly difficult to simulate as-yet-unwritten applications.

**Analytic Modeling.** A relatively recent development in performance prediction is analytic modeling, the construction of an abstract mathematical model of a computer system using elements of queuing theory (see Figure 2). Once the model that represents hardware, software and work loads is built, it can be "solved" for the desired response times and throughputs. To further simplify the solution process, a performance calculator program embodying the queuing theory algorithms can do the computational work for the planner. Easy-to-use implementations of such performance calculator programs are now available.

Analytic modeling has several advantages. The data required to construct a model usually is derivable from the system's own measurement programs. The solution process is rapid, involving only arithmetic calculations. The planner can determine the performance of a particular configuration in a small fraction of the time that a comparable simulation would take. The very nature of the queuing theory model makes it easy for the planner to determine actual or potential bottlenecks that degrade performance.

The "robustness" of the analytical model allows the planner to make some extremely useful simplifying assumptions. Most notably, he can aggregate into a single parameter all the service times that a transaction demands from a particular device. For example, a transaction that visits a device four times for a total of 125 msec can be modeled in the same way as a transaction that makes a single 125-msec visit, with very little difference in the calculated performance.

A particular strength of analytic modeling is its ability to tackle the problem of representing as-yet-unwritten applications. At the design stage, an analytic model can be specified at a gross-approximation level. Then, as the application is coded, the planner can refine the model, producing a series of increasingly accurate predictions of the system's eventual performance.

As the capacity planning field develops, the planner can look forward to improvements in the performance measurement data provided by operating systems and application subsystems. He can also expect easier-to-use, more accurate performance calculation techniques.

#### About the Author

John J. Posner is a consultant with BGS Systems, Inc. of Waltham, Mass., a company that provides capacity planning software products and consulting services.

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User education is a vital element of capacity management. The goal of this article is to give capacity management professionals a practical, step-by-step approach to increase their effectiveness in responding to user community needs and influencing attitudes and behavior to improve system performance.

For the purposes of this article, I define capacity management as a corporate function that monitors, controls, measures and projects the amount, kind and configuration of hardware and software required in the short and long term to meet the information processing needs of the corporation.

Capacity management may include any or all of the following sub-functions: measurement and tuning, performance and reporting/variance analysis, service-level reporting, modeling/simulation, work-load characterization/analysis, configuration analysis, hardware planning and application system evaluation.

In addition, the user interface function may be a separate area or may be part of any of the above efforts.

Where does user education fit into the capacity management function?

First of all, it is a major component of performance reporting and may be part of service-level reporting, particularly as an adjunct to service contract negotiations. It is no longer sufficient in most shops to simply churn out a monthly status report or a few bar graphs showing utilization levels. Management needs more detailed and more pragmatic information in identifying system problems and solutions.

User education is the key element in the user interface function of capacity management, a function that has assumed increased importance in the age of data bases and distrib-

uted processing. As data processing becomes more involved in the basic business of the corporation, as more and more departments "go on-line," capacity management staffs are required to spend an ever-increasing amount of time in developing and maintaining effective communications with the user community.

Two points should be made about this user community. It is increasing not only in size, but also in diversity. You, the capacity management staff, are no longer just talking to the applications programmers. You are talking to accountants, reservation agents, librarians, inventory control clerks, sales people, warehousemen and CEOs.

In short, you are being asked to step out of the "bit-and-byte" world into a complex business environment. Your task is to translate system goals and requirements into user needs and activities and vice-versa for almost every department in the company. It is a real and difficult challenge which most capacity management staffs are just now beginning to confront.

This challenge is made even more difficult by a second important aspect of the user community: its increasing sophistication. User management has been to data processing classes. These managers have worked with telecommunications networks and may even have personal computers at home.

They are no longer satisfied with DP double-talk or super-technical discussions of the operating system's peculiarities. They want information that is comprehensive and translatable into standard business terms.

This, then, is the context of user education efforts in the field of capacity management. Education is a necessary extension of performance

and service-level reporting and is the key element in the user interface function. User education is not only politically advantageous, but often an organizational requirement.

Moreover, user education is an excellent way to focus your own efforts in helping to identify and direct analysis into key areas.

For these reasons, whatever amount of time you now spend in educating users, you are bound to spend even more. And because this activity is

ty management, let me outline certain key criteria for all effective education and then apply them to a capacity management environment.

I am assuming that you (1) are facing the challenges I outlined above, (2) are willing to meet them and (3) do not have training or experience in teaching.

If there are educators among you, I believe you can suggest these recommendations to your technical personnel as practical, everyday guidelines to improve their user

- (6) Credibility.
- (7) Propriety.
- (8) Effective presentation.
- (9) Follow-up.

Interest. The first criterion is more a political than an educational one, but failure to consider it may negate all the others. You have to be very clear from the outset about your interests and those of the users in the area of capacity management.

How often have you gone to users to talk about the subject only to meet with an indifferent shrug or the pointed comment that they are too busy or too important to deal with your concerns?

Behind such "unreasonable" behavior is always the question, "What's in it for me?" Why should the users play by your rules? Specifically, why should they rearrange work schedules, spend hours with your systems analysts mapping out new applications or reduce the size of their on-line data base?

You cannot simply say that this will increase efficiency or reduce costs because they feel you are talking about *your* inefficiency and *your* costs. Parochialism is the bane of even the smallest company.

On the other hand, the users might point out that following your recommendations would make *them* less efficient and increase *their* costs, to the detriment of the corporation. Be sensitive to this argument. They might very well be right, in which case you commit the folly of seeing the trees but not the forest.

When it comes to assessing interest, you should be very clear on your own interests as well.

Why is the capacity management staff really trying to educate the users? Is it an attempt to forestall the acquisition of new hardware? Are you in danger of losing your whole data base system because of constant abuse by a certain department?

Or is it because someone "out there" has been yelling long and loud enough at the right people to force you into delivering better response time?

Each can be a perfectly valid reason for educating users, but requires a different kind of presentation. The more honest you are with yourselves and the audience about the purposes of the education effort, the more likely you are to succeed.

Assessing interest allows you to determine the goals of the presentation and the topics to be covered.

Depending upon your problem areas, any of the following topics might be discussed:

- Hardware requirements.
- Conversion scenarios/system changes.
- New application assessment.
- Scheduling.
- File structure and data base organization concepts.
- Selective access.
- Purge, compress, dump-to-tape and other routines that help streamline data bases.
- Shared data bases.
- File naming and documentation conventions.
- Quantity and size of printouts.

Obviously, not all of these need to be discussed with any one department.

If several topics are appropriate, they need not be discussed at any one session, but should be ranked in order of priority and form the basis for a continuing effort. The goal, once again, is to establish effective two-way communication in order to enhance system performance.

One more point: Topics should be selected with a realistic view as to the extent to which users have control over these areas.

Union agreements may not allow work to be shifted to off-hours; corporate policy may preclude shared access or shared data bases. The user education effort must be sensitive

# USER EDUCATION FOR CAPACITY MANAGEMENT

By Leilani Allen

critical in representing you to the corporation, you had better make sure it is done well.

You must remember that 90% of user education, just like all data processing education, is education, not data processing. Unfortunately, 90% of all DP courses are taught by data processing professionals, not educators. The result? About 90% is a waste of everyone's time and energy.

How do we overcome this problem? As an educator who has also been responsible for some aspects of capaci-

ty management.

I am also assuming that you have a fairly sophisticated capacity management function in place so that you can identify actual system problems, can research the problems to develop a strategy to solve them and have management authority to implement these changes.

## Nine Key Criteria

I have identified nine key criteria for effective education:

- (1) Interest.
- (2) Specificity.
- (3) Comprehensive-ness.
- (4) Relevancy.
- (5) Immediacy.

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## IN DEPTH

to corporate realities.

**Specificity.** Once the topics have been identified, you should be sure to make your suggestions as specific as possible. It is not enough to say "schedule your work load for off-hours." To many departments with on-line applications, this might mean between 4 and 5 p.m., precisely when the system is being hit with batch work. Instead, you might suggest 7 to 8 a.m. as a more appropriate time slot to balance the work load.

If data base organization seems inefficient, map out a detailed strategy to convert to a more efficient structure. Do not simply make the declaration that management should be more selective in determining who has access to the system. Instead, develop a set of criteria that should be applied to reduce the number of users. Offering an array of vague generalities is preaching, not educating.

**Comprehensiveness.** In order to be specific, your analysis must be com-

prehensive. You must have done the necessary research and analysis to identify all aspects of the situation, not just the most obvious or most meaningful to you.

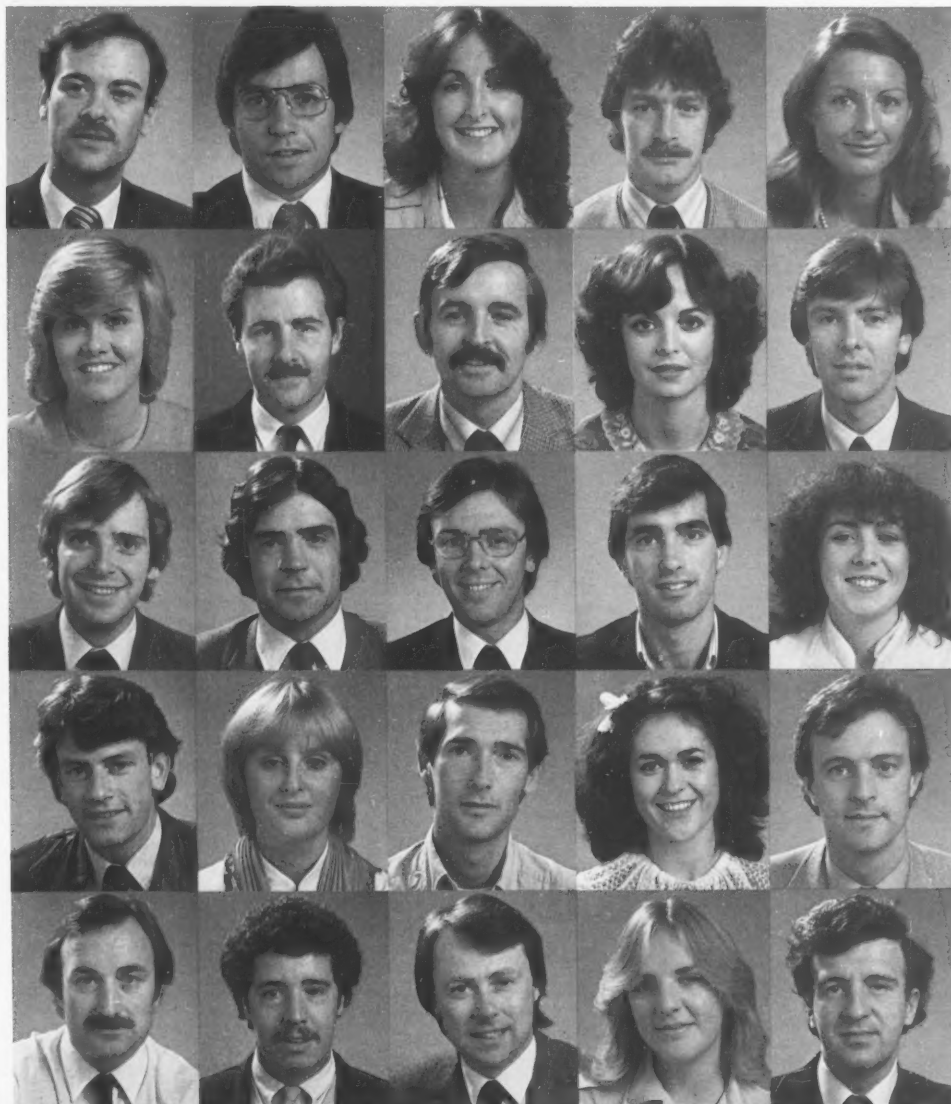
Let's say you have the following problem: Department A is going to hire three more applications programmers to work on a hot project. It needs a terminal for each new hire, yet corporate management says no more hardware acquisitions for the next six months. Your problem is to

find unused terminals that can be loaned or permanently transferred to Department A.

Department B has a medium-size, on-line data base. Two clerks each sit at a terminal all day updating entries or producing reports. Can you "liberate" one of their terminals?

To answer this question, you can naturally do an analysis of the work involved, including the kind and number of reports to see whether the two individuals could share a termi-

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nal and still produce the desired output within the time constraints that management has specified.

You complete your analysis and conclude that Department B can easily get along with one device. You schedule a meeting with Department B to explain the reasons and circumstances of the change and to demonstrate the relatively minor scheduling considerations that need to be implemented.

You give the presentation, and the

next day Department B's manager is knocking on your door to tell you the plan will not work and he is going to fight it all the way.

Is your analysis wrong? No, but it was not comprehensive. Had you inquired further, you would have found that the data entry clerks were formerly file clerks. Now that they are sitting in front of terminals, they receive more pay and prestige than before.

If each is going to access the termi-

nal for only four hours instead of eight, that leaves four hours during which they would be assigned to (in their eyes) less desirable activity. They are quite naturally outraged, and Department B's manager, to keep the peace, promises to fight the move and thus to fight you. If you give in to him, Department A's manager is going to feel cheated of a tube and your manager will demand to know why he is suddenly in the middle of this mess.

Does this sound familiar? It should, because it happens every day. How could your analysis have been more comprehensive? You might have examined what management did with the reports it received. Did it perform further calculations with the data? Did it put the data in graphics form? If so, could one of the clerks have his job description changed so as to spend his off-line time doing these more meaningful tasks?

Maybe, maybe not. But at least you would have an alternative for Department B's manager when he was determined to reject your proposal.

**Relevancy.** Once you have concluded a comprehensive analysis of the key topics to be discussed in the presentation, you now have to make those topics relevant to the audience.

A favorite slogan of campus activists, relevancy is nonetheless a key educational concept. Stated simply, we learn best that which concerns us most. To me, the irrigation patterns of the upper Nile delta is a valid subject, but certainly not as relevant as learning how to use an automated teller machine. The Egyptian cotton grower, of course, has precisely the opposite perspective.

In the field of capacity management, the discussion must involve measures and behavior that are relevant to the users. An accounting clerk probably considers the lack of available cylinders on an IBM 3350 totally irrelevant. If that same subject is dealt with in terms of possibly unnecessary capital expenditure, that fact sinks home. Effective education implies that you state the problems and alternatives in a manner relevant to the audience, not to you.

You may often have to be quite imaginative in your ways of characterizing the situation. A projected work load increase may be described in terms of an additional 500 invoices per day, 300 keystrokes per hour, 5,000 bottles per assembly line per minute; system bottlenecks may be compared to lines at the rest rooms or company cafeteria. Sometimes the more ridiculous the analogy, the better it is remembered.

**Immediacy.** Education is most effective when the student senses that it is not only important to learn the information, but to learn it *now*. We have all been subjected to "FYI" memos. Most deal with subjects that are relevant to us, otherwise we would not have received them. Why, then, are they usually tossed after quick review? Because they lack immediacy, the sense that some action is required within a relatively short period of time.

Recognizing this, user education for capacity management must be carefully timed so that the problems being dealt with are real and current and that a change in behavior or structure *now* is important. It also implies that if the users change their behavior in accordance with your suggestions, they will realize immediate improvement in their interac-

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## IN DEPTH

tions with the system in terms of availability, turnaround time, response time and so forth. If you cannot promise this, you have not isolated the problem sufficiently. One slip like this can destroy your credibility for good.

**Credibility.** Students must be confident that the educator knows what he is talking about — has done the necessary research and analysis and can assume the role of expert, even if only temporarily. Credibility also implies that the educator has the authority to require adherence to the rules of the game. Without the necessary credibility and authority, no one will take the educator seriously.

This can be a real problem for the capacity management team, who are often new kids on the block and do not have an established corporate track record. If there has traditionally been a communications breakdown (read: war) between data processing and the users, the difficulty is compounded. Worst of all, if the users suspect that you do not have the necessary clout to enforce your recommendations, they will tune you out.

I cannot tell you how to gain credibility, but I will mention the easiest way to lose it — by not having all relevant facts assembled to present a logical and structured view of the user's interaction with the system. A shop foreman can tell you anything you want to know about the MJX drill press he uses on the line, including when it malfunctions and why. He naturally expects you to be able to do the same with the tools of your trade — the CPU and its peripherals.

He is not looking for details about bits and bytes — he wants to make sure you can explain why his terminal gets bad response time from 2 to 3 p.m. every day, why his inventory report is always late, why the computer room still cannot find the tape with the quarterly production statistics. He expects you to offer simple and reasonable suggestions on how to correct this situation. It does you no good to say you will look into the problem or you do not have the system data to research the situation. You had better have it if you expect anyone to listen to your message.

**Propriety.** You must pitch your presentation to the proper level of user. A recommendation that requires altering work schedules will need to be approved by the appropriate supervisor, manager or vice-president. In some installations (especially those with unionized personnel) it may require a decision of the board of directors. It serves no purpose to suggest these changes to data entry clerks, who have no authority to comply. On the other hand, details

about file structure or data base organization will be lost on management but are under the control of the applications programmers.

This means that you might create several presentations, all dealing with different aspects of the situation and directed at different groups. As long as the recommendations are consistent, management should be supportive of this multilevel approach. And management is always one of your audiences, even if only

implicitly.

**Presentation.** Literally thousands of books and articles cover the subject of effective presentation. In my judgment, all their advice boils down to the following three principles:

- (1) Organize your topics in a logical and consistent order.
- (2) Speak or write clearly and directly.
- (3) Do not rely on your own judgment in determining if your presen-

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tation meets standards 1 and 2.

We all know that what one says is often less important than how one says it, so spend enough time to present your material well. If you are preparing a written memorandum, make sure it is brief and to the point, written in short declarative statements free of jargon and with no typos or misspellings. If the information will be delivered orally, make sure any visuals are clear and easy to read, that you speak loudly and distinctly, that you stick to the point and that you appear to be fully comfortable with the content and structure of your presentation.

Lack of time or experience is no excuse for a poor presentation. Many of you have excellent training or technical writing departments who can assist you with this effort. Take advantage of the skills and experience they have to offer. No one expects you to become a professional educator. However, as I stated at the beginning of the discussion, user interface is assuming an increasingly crucial role in the area of capacity management.

**Follow-up.** Now that the presentation is complete, is your job over? No, because you still need to follow up. Every educational effort must provide a means whereby the new knowledge may be pursued further, reinforced, tested or rewarded. If the audience needs to enhance its knowledge of systems or standards, identify where and how in the organization they may find the necessary information. If you are teaching specific skills or discussing new commands that can increase efficiency, you might prepare a brief oral or written quiz on the subject. If you are

empowered to audit the user's files, you should announce when the audit will take place and what the rewards for compliance with your recommendations will be.

Most important, if the users do follow your suggestions, get back to them to let them know if the situation has improved or if further efforts are needed. Make sure that their efforts are passed along to management, which may arrange appropriate rewards. If you do, the user community will be more receptive to future suggestions which will make your job easier and more efficient.

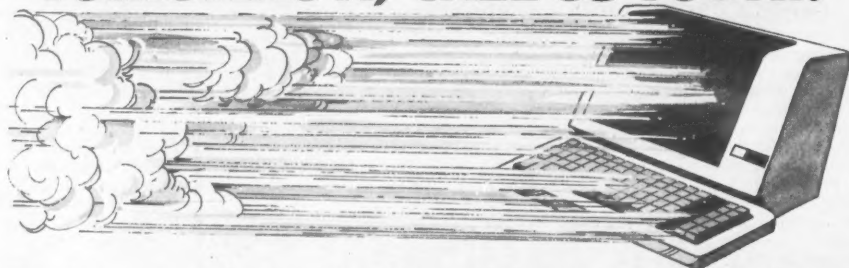
How can you judge whether your presentation has been effective? You can use both concrete and abstract measures.

Concrete measures are specific to the problem addressed. If disk space was a problem, has the number of cylinders assigned been reduced or at least remained stable? If an administrative structure was to be implemented, are the users playing by the rules and following procedure? If peak hour response time was the problem, has the situation improved? Concrete measures are usually fairly easy to document and publicize.

Abstract measures are primarily attitudinal and behavioral. For instance, to what extent are users now asking for your input or analysis before implementing a new application? Are they presenting more realistic requests for disk space than before? Are they more willing to run jobs during off-hours? Do you hear about problems directly, rather than waiting for their manager to speak to your manager?

All of these are indications that the message of user responsibility for capacity management is taking effect. In the long run, this should make your job easier and boost system efficiency as well.

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Dr. Leilani Allen is a consulting analyst in the Educational Services Division of Boole & Babbage, Inc. She is responsible for technical course design and development in the areas of capacity management, systems management and capacity planning and modeling. She is coauthoring a book on these topics that will be available sometime next year.

Allen received her B.A. and M.A. degrees from San Francisco State University and her Ph.D. from the University of Connecticut.

## Raytheon Replaces PTS/1200 With Two More DDP Systems

NORWOOD, Mass. — Raytheon Data Systems Co. has announced configurations and pricing for its PTS/1240 and PTS/1260 distributed processing systems. The models replace the PTS/1200 Mark I and Mark II.

The PTS/1240 is a full-function DDP system with intermediate disk storage capacity that supports up to 24 CRT terminals. It supports up to four 10M-byte fixed and removable disks — with an availability of up to 128K bytes of high-speed MOS memory.

The system can be configured from the Model 1025 processor subsystem to provide the ability to connect up to 24 CRT terminals and 20 printers — a total of 32 devices maximum.

Typical purchase pricing for the PTS/1240 with, as one example, 64K-byte mem-

ory, 10M-byte cartridge disk drive and controller, 2780, 3780 or Hasp and up-line 3270 binary synchronous communications (BSC) is \$33,085.

The PTS/1260 is a full-function DDP system with large-capacity disk storage using the vendor's 80M-byte disk storage module. Data is stored on a removable five high disk pack with a maximum of four disk packs per system.

These packs are interchangeable between drives, which enables the PTS/1260 to support a total of up to 320M bytes of on-line storage per controller.

The system is designed for applications that require a large number of keyboard displays and high-capacity local storage.

Like the PTS/1240, it is (Continued on Page 56)

## Users, Vendor Ask End To Time-of-Day Wats

By Phil Hirsch

CW Washington Bureau  
WASHINGTON, D.C. — Two organizations — one representing Wats users, the other a supplier of a competing service — have asked the federal court of appeals here to set aside the Time-of-Day Wats tariff developed by AT&T early this year and put into effect by the Federal Communications Commission (FCC) June 1.

The Aerospace Industries Association (AIA) and Southern Pacific Communications Co. (SPCC) said basically that the commission failed to investigate all the relevant issues, as the Communications Act of 1934 requires, and authorized a tariff containing provisions that the FCC itself has found to be anticompetitive. For example, despite two FCC rulings that Wats and Message Toll Service (MTS) are "like" offer-

ings, Wats users allegedly continue to pay less than MTS users for like long-distance calls.

If the appeals court agrees with the petitioners, the previous Wats tariff probably will be reimposed, at least temporarily. The former tariff charged small-volume users much more and high-volume users much less than they are currently paying. SPCC's Sprint service, which competes directly with Wats for the patronage of users with relatively small communications volumes, will be "devastated" if the present "predatorily low rates" remain in force.

AIA represents companies that make heavy use of Wats service. According to the association, heavy users represent 10% of the Wats customer population, but under the current tariff they pay 90% of the charges.

## DG Adds Smart Terminals For Eclipses Under AOS

WESTBORO, Mass. — Two smart CRT terminals that reportedly help simplify applications development are available from Data General Corp. for its Eclipse computer systems running under the Advanced Operating System (AOS) and AOS/VS.

The Dasher D400 and D450 terminals offer advanced screen- and text-handling capabilities for business graphics, multiple windows, editing functions and bidirectional vertical scrolling.

They are said to be the only smart CRT terminals that can separate information into as many as 24 windows on the screen, each with independent scrolling and editing capabilities.

They also simultaneously display 80-col text and 135-col text in separate windows, a DG spokesman noted.

Both terminals feature a 256-char. set that includes seven different languages — as well as scientific and word processing symbols — and a line-drawing set for simple graphs and bar charts. Both terminals offer editing features such as insert and delete line and character, according to the vendor.

Additionally, the Model D450 supports business graphics. DG's Trendview interactive business graphics software will support both the D450 and G300 terminals. Trendview creates pie, bar and line charts directly from tabular data, the vendor said.



The Data General D400 and D450

The D400 costs \$2,000, the D450 costs \$2,500 and the detachable sculptured keyboard for both models costs \$300, Data General said from Westboro, Mass. 01580.

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# Local-Area Net Capability for VAX Updated

MERRIMACK, N.H. — Digital Equipment Corp. has announced the latest implementation of the Decdataway, a local-area networking capability for superminicomputer applications in manufacturing industries.

VAX-11 DY 32 Decdataway is a hardware and software package that is said to enable VAX-11/750 and VAX-11/780 computers to be linked to microcomputer-based "distributed intelligence systems" over the Decdataway, a synchronous, multidrop, shielded, twisted-pair cable.

The product enables a host computer system to communicate with as many as 31 remote devices at speeds of 56K bit/sec. Communication is in block mode and managed by the Decdataway's controller, freeing host resources from the demands of network management.

Features include high noise immunity, isolation and diagnostic facilities. Typical application areas in-

clude process monitoring and control, numerical control, robotics and data concentration from terminals.

The host VAX-11 computer system can also be tied into a larger computer network as a node, enabling users to integrate the system's operation

into all aspects of a plant's manufacturing applications.

The latest Decdataway implementation is available in kit form, to be added to an existing VAX-11/750 or 780 having at least 1M byte of memory, a Massbus system disk such as the RM03, RM05, RP06 or RM80 and a

1,600-bit/in. magnetic tape drive.

Kits include VAX-11 DY 32 Decdataway and RSX-11S licenses; two controllers, connectors and test cable; training, support and a 90-day hardware warranty. The price is \$25,000, fully supported, DEC said from Maynard, Mass. 01754.

## 'BCP' Furnishes Host Support For IBM 5280

NEW YORK — Computer Dynamics, Inc. has announced that its Batch Communications Program (BCP) now provides host support for the IBM 5280 distributed data processing system.

The BCP is said to provide a direct data link between IBM 360/370, 30 series and a 4300 series host computers and IBM 5280 systems. The software is a multitasking, multiline communications system that is said to support an unlimited number of 5280 systems. The BCP automatically

dials the remote 5280 terminals and, unlike the remote job-entry type transmission links, completely controls and monitors the communications environment.

The single-line BCP version costs \$8,000 and the multitasking version costs \$12,000, Computer Dynamics said from Suite 407, 390 Fifth Ave., New York, N.Y. 10018

## Touch-Sensitive Unit Provides Non-DPer With Data Retrieval

BLOOMINGTON, Minn. — A touch-sensitive terminal said to incorporate touch capabilities with menu-driven programs to provide simple information retrieval by non-DPer's has been announced by A.R. Shaw, Inc.

The Touch Command Model 40 screen has 80 discrete touch positions and each position size is three lines by eight char. The 12-in. diagonal screen has a format of 24 lines by 80 char. and a character set with 128 Ascii codes, the company said.

The terminal uses the RS-232C interface and has a transmission speed of up to 9,600 bit/sec, the vendor claimed.

The Touch Command Model 40 ter-



Touch Command Model 40

terminal is priced at \$2,800 with quantity discounts available from A.R. Shaw, Inc., 10800 Lyndale Ave., Bloomington, Minn. 55420.

## Fiber-Optic Data Set Handles High-Speed Transfers

CANOGA PARK, Calif. — Canoga Data Systems, Inc. is offering a fiber-optic data set for high-speed computer-to-computer data transfer or the extension of satellite data links.

The Model CSY-306 fiber-optic data set is said to provide complete data security, error rates 10,000 times lower than comparable hard-wire connected modems and complete electrical isolation, the vendor explained.

Available with standard V.35 or RS-449/422 or RS-449/423 interfaces, the CSY-306 can operate at selectable data rates from 56K bit/sec to 2.6M bit/sec. Other data rates from 2.4K bit/sec to 4M bit/sec are possible using an external clock or an alternate internal crystal, according to the vendor.

The Model CSY-306 costs \$1,800 from Canoga Data Systems, 21218 Vanowen St., Canoga Park, Calif. 91303.

## PTS/1200 Gets Replacements

(Continued from Page 55)

based on the Model 1025 processor subsystem that provides the capability to support up to 24 CRT terminals and up to 20 peripherals.

Typical purchase pricing for the system with, as an example, 64K-byte memory, 2780, 3780 or Hasp and up-line BSC is \$50,955, Raytheon said from 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

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## Lee Adds SNA To Model 320

MINNEAPOLIS — Lee Data Corp. has added Systems Network Architecture (SNA) support capabilities to its Model 320 Local Display System. The firm claims it is the only IBM 3270 supplier to provide both local and remote 3274-compatible systems.

The three-year lease price for a typical Model 320 Local Display System, consisting of a system controller with 128K bytes of memory to support SNA buffering requirements, seven All-In-One CRT terminals and a 120 char./sec printer, is \$1,188/mo. Purchase price is \$42,552 and SNA software support is free, Lee said from 10206 Crosstown Circle, Minneapolis, Minn. 55344.

## Data Briefs

### Prices Slashed 20% For Hinet User Station

OAKLAND, Calif. — Digital Microsystems, Inc. has announced a 20% price reduction on its Hinet Basic User Station.

The DSC-3/B Basic User Station now costs \$1,595, a \$400 reduction from the previous price. Reportedly compatible with "virtually any" RS-232 terminal, the DSC-3/

B is said to provide independent processing with network communications capabilities and full I/O for two printers and a communications modem.

The firm is located at 1840 Embarcadero, Oakland, Calif. 94606.

### Adage Workstations Linked via Bell DDS

BILLERICA, Mass. — A telecommunications capabil-

ity said to interface to the Bell System's Digital Data System (DDS) link at 56K bit/sec has been announced by Adage, Inc. The announcement extends the company's capability to remotely locate its IBM-compatible computer graphics workstations from the host computer.

Up to four of the company's interactive computer graphics workstations can be operated per 56K bit/sec line, the vendor claimed.

The 56K bit/sec capability is priced at \$800 with delivery beginning in January 1982 from Adage, Inc., One Fortune Drive, Billerica, Mass. 01821.

### Banks Gain Solution To Same-Day Payment

NEW YORK — Complex Systems, Inc. (CSI) has introduced a computerized payment system based on IBM hardware designed for banks that have 200 to 500 daily Chips transactions (send/receive).

FTS 81½ is an effective solution to the Federal Reserve requirement for same-day interbank payment settlement, effective Oct. 1 of this year. In addition, it will optionally interface to Fedwire, Bankwire II and is compatible with TWX and Telex, the vendor said.

The basic configuration for smaller volume use costs less than \$100,000 for hardware and software, CSI said from 475 Park Ave. S., New York, N.Y. 10016.



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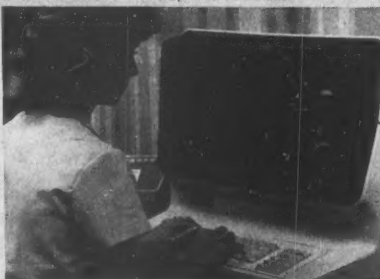
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## Makes Interstate Move in Week EPA Pulls Plug on Washington Center

**RESEARCH TRIANGLE PARK, N.C.** — Moving in with family or friends to share expenses and cut costs is not unusual in these days of rising inflation and shrinking dollars. When the "family" is the Environmental Protection Agency (EPA) and its members are the National Computer Centers' two complete computer systems — located hundreds of miles apart — the move might be considered a bit unusual.

About a year ago, the EPA pulled the plug on its Washington, D.C.-based IBM system — which was held on a facilities contract with Comnet, Inc. — packed it on several trucks and relocated it to its Univac facility here. The move began the day after Christmas 1980 and was completed before the dawning of the new year.

Equipment that took part in the interstate shuffle included approximately 80,000 disk data sets on 24 IBM 3350 disk systems and 300 mountable 3330-1 and 3330-11 disk packs and some 30,000 reels of magnetic tape. However, rather than move the Washington, D.C. center's IBM 370/168 and 3032 mainframes, the EPA installed a government surplus 370/168 MP at its site here.

At the moment, the new IBM facility here is made up of the IBM system and 120 Model 3350 and 3330-11 disk drives.

### Cost-Cutting Move

The EPA decided to make the move and merge the centers to cut down costs on the communications network, software packages and other redundant contracts. The merged systems would also benefit by being under the umbrella of one management and support staff.

The move not only required literally hundreds of coordinating tasks such as transferring the communications network, changing leases on software, physically moving the data, but also necessitated establishing a support relationship with the new facility management staff, according to Sam Brown, the National Computer Center's di-

rector. Making the move as transparent as possible to the system's approximately 2,300 remote on-line and batch users was also important.

A big concern with the EPA was whether to move the equipment gradually or all at once. Because it seemed safer, many people, including a General Services Administration auditor, favored a phased approach. However, this tack was eliminated because the cost and

complexity of maintaining two incomplete centers with duplicate communications and support staffs and partially duplicated data was deemed a higher risk than the possibility of a component failing at the new site.

Users of the IBM facility were heavily involved in the move, first with planning targets and later with testing the center at the National Computer Center prior to the move.

The EPA's list of move priorities were divided into five major categories. First was the expansion of Research Triangle Park's (RTP) Univac communications network with facilities at the National Computer Center to enable users to log on to either machine through the same network.

The next step was to duplicate the OS environment. With Comnet, the EPA was running a  
(Continued on Page 60)

## Series of Five Data Base Machines Introduced for OEMs by CSSN

**BOSTON** — Computer Service Systems Network, Inc. (CSSN) has introduced a line of data base machines for the OEM market that reportedly incorporate the hardware and software necessary to handle data base applications and maintain host independence.

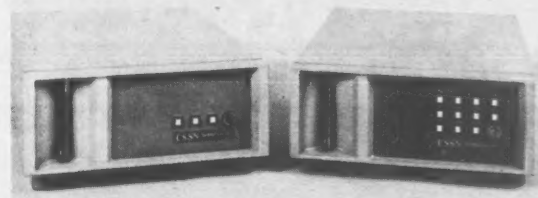
The new entries include the Dispatch 10, 20, 30, 50 and 100. The Dispatch 10 is intended to be delivered, preprogrammed, to the end user by an OEM or systems house, CSSN noted.

The software system for the Dispatch 10 includes a Digital Research, Inc. CP/M-compatible operating system called Fast, a Codasyl data base package, a communications package, a packet protocol and a micro-diagnostics package, according to CSSN. Optional software is said to include a data recovery package and recovery transaction log.

Its hardware includes a Zilog Corp. Z80 processor with S-100 bus architecture, 64K-byte random-access memory (RAM), a 10M-byte disk with 13.4M-byte tape cartridge backup, two serial ports, a standard switch console and an RS-232C serial interface.

### Some Options

The Dispatch 20 is said to provide all of the necessary software to develop custom applications and can be used to program the Dispatch 10.



The Dispatch 10 (left) is intended to be delivered preprogrammed to the user; the Dispatch 20 (right) brings to the Dispatch 10 the software to develop custom file management applications and can be used to program the Dispatch 10.

This system, and subsequent models, includes the standard software package plus an assembler, program editor, linking loader, debugger and Fortran or Cobol as standard host/development languages. PL/I and C are available as optional languages, the vendor added. A query/report writer is an option.

The hardware includes a 24M-byte disk, a parallel port as well as two serial ports and a full-system console.

The Dispatch 30 reportedly upgrades data base support with a memory-mapping processor. The standard hardware includes a 45M-byte disk and 128K-byte RAM.

The Dispatch 50 provides a multiprocessor OS with access to a data base through several processors, the vendor said. Hardware includes two task processors, each containing a

Z80 and each with 64K-bytes RAM and a serial port.

Proprietary software reportedly allows the Dispatch 100 to act as a stand-alone system as well as a back-end data base machine. In a four-station cluster, for example, hardware includes a data base management processor, four task processors, four terminals with high-speed dot matrix printers, plus an operational terminal, the vendor said.

The system offers a 45M-byte disk and 384K-bytes RAM, which can be expanded to 2M bytes, according to the vendor. The software includes the query/report writer.

Prices for the Dispatch 10, 20, 30, 50 and 100 are \$13,995, \$18,250, \$23,850, \$27,995 and \$41,195, respectively. OEM quantity discounts are available. CSSN is located at 582 E St., Boston, Mass. 02210.

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## Topaz Updates Powercenters

SAN DIEGO — A series of power distribution systems with a computer grounding technique has been developed by the DDP Division of Topaz, Inc.

Powercenter is a self-contained power distribution system that accepts ac source power and distributes it to computers and peripherals. Ultra-Ground is an internal single-point grounding system said to eliminate stray ground noises.

Available in models with power ratings from 30 kVA to 200 kVA for 60Hz operation and 50 kVA to 150 kVA for 50Hz operation, Powercenter with Ultra-Ground carries a base price of \$11,750. Topaz is at 3855 Ruffin Road, San Diego, Calif. 92123.

## AJ Unit Built For Data Entry

SAN JOSE, Calif. — A host-programmable CRT terminal for data entry has been announced by Anderson Jacobson, Inc. (AJ).

The AJ510-02 Smart CRT reportedly fits into a variety of data base management systems. Page and field delimiters can be set as required by the user's system.

The user can create specific fields on the terminal for data entry and protected fields for preventing the entering of alpha characters into numeric-only fields, the vendor said.

The AJ510-02 CRT terminal costs \$2,195 from the firm at 521 Charcot Ave., San Jose, Calif. 95131.

## EPA Moves CPU in a Week

(Continued from Page 59)

heavily modified OS-MVT to support its system. When the National Computer Center decided on the move, it tasked the Comnet contract to convert to MVS. This involved extensive testing of user programs, purchased software and system utilities to achieve a duplicate OS environment.

A third concern was for purchased software. The National Computer Center supports an extensive library of analysis, data management and utility software. Leases and licenses had to be transferred from Comnet on behalf of the EPA to EPA itself. Also, the merger of IBM and Univac centers created a changed user environment. It was necessary to define, document and explain the new envi-

ronment to users and user support well in advance of the move.

The final concern was the move itself. Planned and practiced like a military maneuver, few elements of the conversion were subjected to so many "what ifs." During the autumn of 1980, extensive analysis of the Comnet environment and documentation was made. Users were queried to find out what they thought they had at Comnet and their responses coordinated with what was actually discovered.

### Practice Moves

A few months before the shift, the EPA conducted several practice moves to unload the disk data, transfer it to RTP, load it, recatalog it and test it. From the start there was a problem of dumping 300 diskpaks of data to tape without impacting the Comnet schedule of weekend activity.

Originally, the big move was scheduled for Thanksgiving weekend, but was canceled and postponed to after Christmas because the communications network was not tested to everyone's satisfaction. The National Computer Center used the opportunity to try a last practice and run through its contingency plan.

Finally, on Dec. 26, the move began. The IBM system in Washington, D.C., was unplugged and three semitrailers of equipment made their way to North Carolina. At RTP, a large staff unloaded the trucks and reassembled the system exactly as planned and practiced.

The day after New Year's Day the system was turned on.

## New VISUAL 300. Now let's compare flexibility and price.

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Video Attributes Require No Display Space	STD	NO
Non Glare Screen	STD	STD
Smooth Scroll, Slow Scroll and Jump Scroll	STD	NO
Audible Key Click	STD	STD
Non Volatile Set-up Modes, "Menu" Style	STD	NO
25 Status Line	STD	STD
Split Screen	STD	STD
Line Drawing Character Set	STD	STD
Block Graphics	STD	NO
Sculptured Keycaps, Matted for Low Glare	STD	NO
Paging	OPT-8 Pgs. OPT-4 Pgs.	STD
Full Editing	STD	STD
Programmable Non Volatile Columnar Tabbing	STD	NO
Choice of Typomatic/Non Typomatic Keyboard	STD	NO
14" Screen	OPT	NO
Independent Xmit/Receive Rates	OPT	NO
N-Key Rollover	STD	NO
CR New Line Mode	STD	NO
Foreign Character Sets	OPT	NO
User Programmable Non-Volatile Answerback, 32 Codes	STD	NO
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ORIENTALS

## Mini Bits

### Storage Modules Added to Syfa Net

IRVINE, Calif. — Computer Automation, Inc. has added two disk storage modules to its Syfa networking system.

The firm now offers 64M-byte and 96M-byte modules in addition to the already an-

nounced 32M-, 80M- and 300M-byte modules.

The 64K-byte module costs \$16,800 and the 96M-byte module costs \$21,800, the vendor said from 2181 Dupont Drive, Irvine, Calif. 92713.

### Micro-Compatible Printer Bows

NEEDHAM HEIGHTS, Mass. — Memodyne Corp. has announced a microprocessor-compatible 20-col alphanumeric thermal printer.

The Model MAP-20P accepts 8-bit TTL parallel input data at up to 2,000 char./sec. The unit includes programmable controls for text or lister printing

and normal or extended character sizes, the vendor said.

Other features include a 96-char. print set, a print rate of two line/sec and an internal self-test mode, according to the vendor.

The units cost \$625, the vendor said from 220 Reservoir St., Needham Heights, Mass. 02194.

### Packaged System Based on LSI-11

NATICK, Mass. — Charles River Data Systems, Inc. has announced a packaged computer system based on Digital Equipment Corp.'s LSI-11/23 central processor.

The MH-11 includes a 20.8M-byte Winchester disk and a choice of system software. A cartridge tape backup system is offered as an option.

Base price for the MH-11 is \$16,000, including central pro-

cessor with 128K bytes of memory, four-port serial interface, Winchester disk and dual double-density floppy disk drives. Operating system software is included in the price; users may choose from DEC's RT-11V4 or Whitesmiths Ltd.'s Idris, which includes C and Pascal languages.

Charles River Data Systems is located at 4 Tech Circle, Natick, Mass. 01760.

### Q-Bus Controller Out for LSI-11s

CANOGA PARK, Calif. — Andromeda Systems, Inc. has announced a Q-bus controller for Winchester-type disk drives on Digital Equipment Corp. LSI-11 systems.

Called the WDC11, the controllers are contained on a single, dual-width card that plugs directly into the Q-bus backplane. The unit emulates DEC's

Rkos or RL01 hard disks as well as DEC's RX02 floppy drive. The unit can handle Winchester backup to a floppy in a single controller, eliminating the two controllers that are usually required, according to the vendor.

The unit costs \$2,000, the vendor said from 9000 Eton Ave., Canoga Park, Calif. 93104.

### Matrix Printer Has Wide Carriage

SALT LAKE CITY, Utah — A matrix printer featuring a wide carriage and designed for mini-computer and microcomputer business systems has been announced by Micro Peripherals, Inc.

The MP150 forms characters bidirectionally in a logic-seeking mode. A high-resolution, dot-addressable graphics capability is included for applica-

tions requiring plotting or printing of screen graphics.

The printer can output a 136-char. line at 10 char./in. It allows full 136-col printouts to be condensed to fit on standard 8½-in. wide paper, the company claimed.

The MP150 is priced at \$1,095 from Micro Peripherals, Inc., 4426 S. Century Drive, Salt Lake City, Utah 84107.

### Voice Entry Terminal Fits Apples

DENTON, Texas — Scott Instruments, Inc. has announced the Shadow/VET, a voice data entry terminal that can interface with an Apple Computer Corp. Apple II microcomputer.

The product allows users to run integer Basic, Applesoft,

machine codes and Pascal programs by voice input. The product does not require program modification, the vendor said.

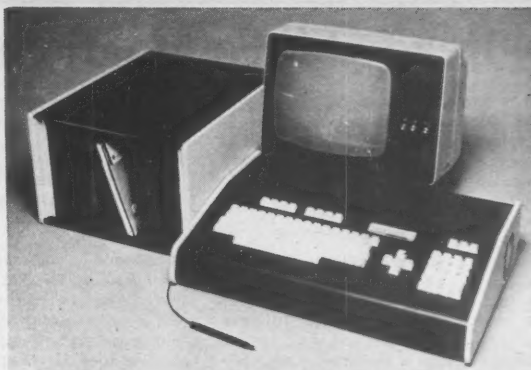
Documentation is included in the \$995 purchase price. Scott is at 1111 Willow Springs Drive, Denton, Texas 76201.

### Detector Monitors Line Transients

ELKHART, Ind. — A power line transient detector said to enable all small system users to monitor power lines for disruptions has been announced by Control Corp. of America.

The PM9-115VAC plugs into a

wall socket. Four LED indicators correspond to peak transient voltages of 200V, 400V, 600V and 800V. The PM9-115VAC is priced at \$98.50 from Control Corp. of America, P.O. Box 2154, Elkhart, Ind. 46515.



The MTU-130

## Desktop Micro Features 'Unix-Like' Software

RALEIGH, N.C. — Micro Technology Unlimited has unveiled a high-performance microprocessor-based desktop computer that offers a Unix-like operating system and built-in antipiracy hardware that allows users to protect the system's software.

The MTU-130 computer is based on the 6502 microprocessor and has up to 256K bytes of memory and address space, a high-resolution graphics capability and up to 4M bytes of floppy disk storage. The system's keyboard has 96 keys including a full numeric keypad, cursor keys, 10 programmable function keys plus a fiber-optic light pen.

The system operates off a single-board computer and has four additional slots in its card cage for expansion. It also features a power supply, fan, one-watt audio amplifier and speaker.

To attach peripherals, the micro-based system has RS-232C and two parallel I/O ports.

#### System Features

The MTU-130 includes Codos, a disk operating system that is said to have files and device-independent I/O patterned after Bell Laboratories' Unix operating system. It also features an enhanced version of Microsoft Basic that allows programs to specify libraries of additional commands appropriate to a particular application.

To protect software from illegal copying, the system's software is designed to read a serial number embedded in the hardware. Programs can check to see if this number matches the number for a particular customer. If the numbers mismatch, the system will not run.

While the built-in hardware method allows a user to make unlimited backup copies of a particular program, these copied programs will only run on the originating machine.

The operating system includes a monitor with 34 built-in commands and English-language error messages and occupies less than 16K bytes of memory including all buffers and I/O device drivers, a spokesman

said.

Standard libraries supplied with the system include graphics and operating system interface commands.

Finally, the system has an 80-char., 25-line display; a four-voice music package that produces high-quality music; an optional virtual graphics library for Basic that is said to be similar to Tektronix, Inc.'s Plot-10 software; and a vector generator that averages about 15,000 pixel/sec in a typical vector mix.

The MTU-130 can be configured with up to four 8-in., double-density disk drives, either single or double sided.

Cost of the MTU-130 varies according to memory, and the number and kind of disk drives supplied. For instance, a system with a basic 80K bytes of memory, a CRT terminal and single-sided floppy disk drive costs \$3,995 while a similar system with two double-sided drives sells for \$4,995, the vendor said. Additional information on the system can be obtained from the firm at 2806 Hillsborough St., Raleigh, N.C. 27605.

## Disk Fits Nova, Eclipse

NORTHBRIDGE, Calif. — Quentin Research, Inc. has announced a Winchester disk subsystem that offers a fixed-head option for Data General Corp. Nova, Eclipse and compatible processors.

Called the Q80, the drive uses IBM 3340-type technology to offer up to 80M bytes of disk storage at transfer rates of up to 1M byte/sec and an average access time of 38 msec. Up to 2.4M bytes of additional storage is available with a fixed head option with an average access time of 10 msec, according to a vendor spokesman.

The Q80 without the fixed head option costs \$8,000. With the fixed head option the subsystem costs \$12,000, the vendor said from 19355 Business Center Drive, Northridge, Calif. 91324.

MINIWORKS

## Turnkey Ready for Foundations

HORSHAM, Pa. — A turnkey system designed for foundation management said to simplify and expedite management reporting, inquiry follow-up, daily correspondence and disbursements control has been announced by Complete Computer Systems, Inc.

Users of foundation management can compose new ad hoc studies with the company's Create Report Generator and any combination of

plant locations, grant type, grantee, employee status or dollar value can be used as the basis for user-generated file reports, the company claimed.

### Output Process

Sorted output can be directed to a printer, video display or typewriter terminal while the system stores different form letters on disk, inserts data to personalize each letter and produces typewriter-

quality correspondence, the vendor said.

The simplest configuration consists of a Data General Corp. Nova minicomputer, 10M bytes of disk storage, a terminal, printer and desk enclosure.

Foundation management prices start at \$50,000 and range upward depending on configuration from Complete Computer Systems, 159 Gibraltar Road, Horsham, Pa. 19044.

## WP, DP Policy Carries All-Risk Coverage

HARTFORD, Conn. — Aetna Insurance Co. is offering a policy tailored to the needs of small businesses as they expand in-house computer facilities. The computer and word processor policy provides all-risk coverage on DP equipment with duplicate and backup media coverage included.

The policy features \$10,000 worth of media and extra ex-

pense coverage. The extra expense coverage provides for those expenses over and above normal operating costs incurred by the insured when business is interrupted by loss of, or damage to, the insured's computer systems.

The policy also provides flood and earthquake coverage, media reproduction with no coinsurance clause applying to the media, replacement cost on equipment and optional coverage for accounts payable and valuable papers.

Aetna is located in Hartford, Conn. 06156.

## "Our name just caught up with everything we do?"

Don Gibson, General Manager, Westinghouse Information Services

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collection, analysis and reporting services. And more. But perhaps the most exciting thing our new organization can offer you is our goal to develop new and innovative products. Because we are a subsidiary of Westinghouse Electric Corporation, we now have one of the most sophisticated research and development centers in the world at our disposal. And you have our pledge to use these resources to bring you optimized data-based systems and expanded data processing services. Now that our name has caught up with everything we do, why not see how we can help with everything you do? Write today to P.O. Box 30, Iowa City, IA 52244, or call (319) 354-9200.



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## CAI Tool, Micro Out

GERMANTOWN, Md. — The International Institute of Applied Technology, Inc. (IIAT) has announced three products: a computer-assisted instructional (CAI) language, an integrated microcomputer system and a touch-panel color monitor.

Pilot plus, designed to run on a variety of micro- and minicomputer systems, is said to be the first CAI authoring language to allow developers to design and implement courses to run on many systems without modification. Its base price is \$150.

### Includes Apple II

The integrated microcomputer system includes an Apple II microcomputer, diskette drive, color monitor with built-in touch panel, Discovision Associates' Model II Videodisc Player with custom IIAT controller card, Z80 card and Pilot plus. Introductory price is \$5,995, the vendor said.

IIAT reportedly will offer the integrated touch panel and color monitor and Apple II microcomputer Interface Card for \$1,399.

An optional interface for a Discovision Model II Player costs \$150. The Videodisc Controller is available separately for \$400, the vendor said.

IIAT is located at 20010 Century Blvd., Germantown, Md. 20767.

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## Market to Triple To \$36 Billion By Start Of Next Decade

By Ann Dooley  
CW Staff

Office automation technology is expected to become so appealing to current and future users that they will send the market spinning into a rapid growth cycle, tripling the current equipment marketplace by the end of the decade, according to two market research firms that recently examined a number of office automation purchasing trends.

Shipments of office automation equipment to U.S. users will reach \$36 billion by the beginning of the next decade, about three times the current amount, according to International Resource Development, Inc. (IRD). Word processing and workstation equipment, together with copier and telecommunications technology, will be the driving forces behind the increased growth. The optical disk-based electronic

filing systems market is expected to develop over the next two years and reach the \$2 billion level by 1990.

The demand for productivity improvement at the managerial and professional level will set employees clamoring for individual workstations, according to IRD.

Word processing is the most common office automation application among organizations. To respond to this user need, more than 100 vendors have introduced word processors over the past five years, according to a Frost & Sullivan, Inc. report on the office automation marketplace. In 1980, users brought WP to the \$2 billion mark, a figure that is expected to reach \$6.8 billion in 1985 for a 28% average annual growth rate.

Communications capabilities will increase, which will work to eliminate

(Continued on Page 68)

## Rather Than Clerical Staff Monsanto Considers Professionals First

ST. LOUIS — Who should benefit more from an automated office system, the clerical staff using it to reduce repetitive typing and filing, or the professionals they support?

At the Monsanto Co., the diversified worldwide chemical manufacturing firm, the answer is "The professionals."

"You can't justify the use of the new computerized office equipment if you're only concerned with increasing the productivity of the clerical force," Jerry Bratsch, corporate director of management information systems (MIS) at Monsanto, said. "You also have to improve the productivity of the professionals. Without that, it won't go."

This philosophy is the cornerstone of an office administrative system now taking form at the firm.

Last summer, the company organized a unit of office technology and consulting services within the MIS department to coordinate office systems development

throughout its worldwide operations.

One of the first tasks was to oversee the installation of an IBM 5520 Administrative System as part of a pilot program to allow the firm's management to evaluate the use of various office systems.

### Two Nebulous Areas

"There are two very nebulous areas that can have a significant impact on the so-called office of the future," Russ Sprague, unit director, said. "One is data base management and the other, networking."

"Until these areas become more defined, it is critical that decision makers have systems that are very flexible and compatible with their mainframe. We felt that piloting the 5520 would give us a feel for the flexibility of the system."

So far, the IBM system has been a success. "We can see that the 5520 has many of the functions of a good office automation tool," Sprague said. "It can give some of our people good productivity benefits while we learn what office automation is all about."

Monsanto installed its first 5520 system

at its St. Louis headquarters in May of 1980. Since then, four additional 5520s have been installed. In addition, one unit is in the electronics division manufacturing plant in St. Peters, Mo., and another is now operating at the electronics division headquarters in Palo Alto, Calif.

The company is using the 5520's electronic document distribution capabilities, linking two on-line interfaced systems here with the 5520 at the St. Peters plant. The next step will link those systems with the 5520 in Palo Alto.

"Many of the people who direct that division have offices both here and in Palo Alto and they are frequently on the move," John Sparks, Monsanto's manager of office systems, explained. "We hope the document distribution capabilities will help reduce the travel and increase the speed of information flowing between the two points."

As additional office systems are installed, Sparks hopes to begin to gather data to help Monsanto thoroughly evaluate its administrative systems.

"The challenge is to develop a unified approach to office automation," he explained. "We're working hard at trying to put together a plan that will analyze the impact of the new technology available and fine-tune the direction Monsanto should or could take."

(Continued on Page 68)

## DEC Users Gain Screen Swapper

BEDFORD, Mass. — A stand-alone product for screen swapping that reportedly can be used with any word processing software on a Digital Equipment Corp. RSTS-based system was announced here by Clyde Digital Systems, Inc.

Called Swap-11, this package was designed to enable a WP user to swap between a number of separate editing tasks, at the same screen, without interrupting them.

Using Swap-11 to swap a screen, the user enters a special command code and the software provides another screen to use without interrupting the normal execution of the first WP job. According to the vendor, the user may run up to four separate tasks from the same terminal at the same time.

The user reportedly can return to any one of the WP tasks at any time and pick up the task where it was left off. When returning to a given task, the screen recovers the user's task context, the vendor explained.

Swap-11 is available immediately and licenses for \$595, according to the vendor, which can be contacted through P.O. Box 348, Bedford, Mass. 01730.

## WP Package Fits VAX Down to LSI

PASADENA, Calif. — CT\*OS, Version 4, a word processing software package available from Compu-Tome, Inc., is now being offered by Digital Equipment Corp. VAX-11 superminis, PDP-11 minicomputers and LSI-11 microprocessors.

Available to run under a variety of operating systems, including its own operating system for single-terminal use, RSTS/E, RSX-11M and VAX/VMS, CT\*OS is written in Macro-11 and presents a minimal overhead load for simultaneous WP/DP operations, both in single- and multiple-station configurations.

Both DEC VT52 and VT100 intelligent terminals, as well as a range of letter- and draft-quality printers, are supported. German, French and Dutch language versions are available. Some of the functions include global search and replace, cut and paste files, list processing, Ascii file handling and stored text libraries.

Pricing for the stand-alone is \$2,200 (single-CPU license), with RSTS/E and RSX-11M versions at \$3,600 and VAX available for \$4,200. Compu-Tome, Inc. is at 234 E. Colorado Blvd., Pasadena, Calif. 91101.

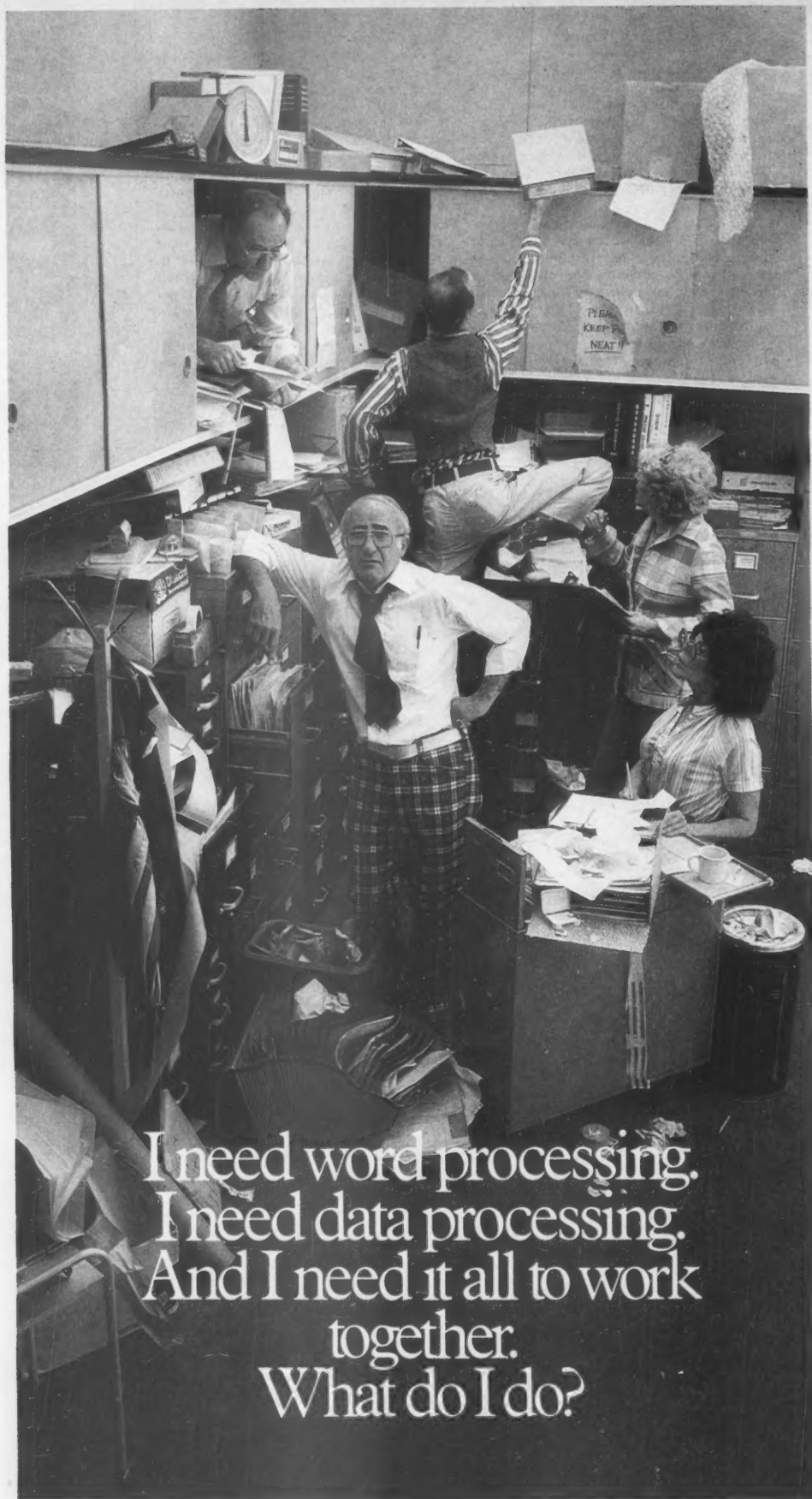
## HP 250 Memory Gets Price Cut

CUPERTINO, Calif. — Hewlett-Packard Co. has lowered the price of semiconductor main memory for the HP 250 office computer system by approximately 25%, effective immediately.

System memory additions of 128K bytes are now available for the HP 250 at a cost of \$2,000/board, down from \$2,625, bringing the memory cost/byte to approximately 1.6 cents.

A 64K-byte memory board for the HP 250 is available at a reduced price of \$1,500, down 25% from \$1,995. If the 64K-byte board is purchased as part of an initial order for an HP 250 system, the price drops to \$750, the firm said.

More information is available from local HP sales offices, HP said from its headquarters at 1501 Page Mill Road, Palo Alto, Calif. 94304.



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For more information call Mr. Laurie Reeves at (800) 225-3222/3 (within the 617 area, call 552-2048). Or write him at Honeywell Office Automation Systems, Three Newton Executive Park Drive, Newton Lower Falls, Massachusetts 02162.

**Honeywell**

## Peachtree Puts Software On CP/M-Based Wangwriter

ATLANTA — MSA, Inc.'s Peachtree Software, Inc. subsidiary will now provide accounting software packages for the new CP/M-enhanced version of the Wang Laboratories, Inc. Wangwriter.

Seven of Peachtree's new V8 series packages will be available for use on the Wangwriter, including general ledger, accounts payable, accounts receivable, payroll, inventory management, sales invoicing and client

posting and accounting — the last a multicompany general ledger package. All the packages are written in Microsoft Basic, supplied in compiled form and feature Peachtree's Visionary screen manager.

Users of the Wangwriter will be able to purchase the client posting and accounting package for \$995 and the other packages for \$595 from Peachtree or selected Peachtree dealers. The packages are scheduled to be available in December or as soon as Wang releases the CP/M operating system for the Wangwriter.

More information is available from Robert Carpenter, MSA, 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

## Controller Runs Non-Wang Units

STOUGHTON, Mass. — Source Research Corp. is offering Wang Laboratories, Inc. system users the option of using non-Wang printers with any Wang word processing or Serial VS system.

This ability to interface non-Wang printers to Wang systems is accomplished with an intelligent interface controller containing 16K bytes of random-access memory and a read-only memory-based emulator for special code conversions. Now being offered are SRC-1, a Centronics, Inc.-compatible interface; SRC-2, a Diablo Systems, Inc.-compatible interface; SRC-3, a Centronics- and Diablo-compatible interface; and SRC-4, an RS-232C-compatible interface.

Pricing for the units starts at \$2,000. A 120-day warranty featuring complete unit replacement in the event of failure is also included from the firm, which is located at 9 Freeman St., Stoughton, Mass. 02072.

## OA CRT Terminal Apple-Compatible

HASTINGS, Minn. — A CRT terminal developed for the office automation industry and said to be compatible with Apple Computer Co. microcomputers has been announced by Micro Display Systems, Inc.

The Genius is also compatible with software packages, including CP/M-based programs, and has a high-resolution display with an 87MHz bandwidth and 6K bytes of high-speed buffer memory to refresh the screen, the vendor said.

The Genius is priced at \$1,795 from Micro Display Systems, Inc., 514 Vermillion St., Hastings, Minn. 55033.

## Magna III, SL WP Owners Get Free Software Upgrades

CHICAGO — A.B. Dick Co. is providing software enhancements that permit several new routines and operating modes free to current owners of Magna III and Magna SL word processing systems.

The diskettes will be included as standard equipment on all new Magna III and Magna SL WP systems.

The Magna III software enhancements include interactive asynchronous communications that permit the system to communicate in both interactive and batch modes with a variety of terminals and computers at speeds up to 1,200 bit/sec. A list-processing feature that selects, sorts, merges and provides an error check-

ing system called Validate is also included.

Among enhancements for the Magna SL system are proportional spacing output, which allows stored text to be printed in either 10- or 12-pitch as recorded on the CRT or a proportional spacing format; interactive asynchronous communications, which enable the Magna SL to communicate interactively with asynchronous terminals and computers at speeds up to 1,200 bit/sec; and key-stroke capture, which allows the Magna SL to memorize keystrokes as they are entered.

A.B. Dick is at 5700 W. Touhy Ave., Chicago, Ill. 60648.

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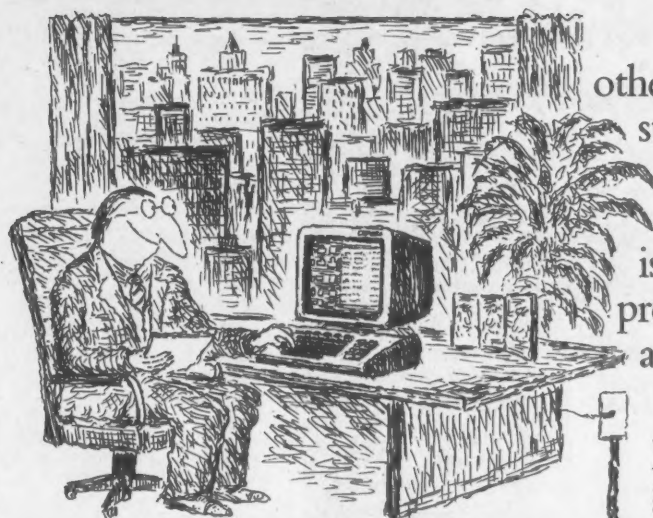
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CW 11-2-81

**XEROX**

# Office Market Seen Tripled by Start of 1990s

(Continued from Page 63)  
equipment redundancy — a major complaint among users. Users will continue to favor partial page displays, which currently account for 61% of the display units installed in 1980, Frost & Sullivan said. This will continue as the fastest growing display type and, by 1985, users will push it into the 84th percentile of total units shipped, with accompanying reve-

nues quadrupling over the five-year period.

Users will purchase fewer word processors that have no displays. Such processors currently account for 13% of total shipments — a percentage share that will almost disappear by 1985, according to the research firm. Single-line displays will also slip to less than a 1% market share by 1985, while full-page displays, accounting for a 23%

market share currently, will also decline in importance, with unit shipments having a 13% market share by mid-decade.

## Shared Logic Down

Shared logic systems, which account for 25% of the total marketplace, will decline to a 22% market share by mid-decade, Frost & Sullivan said. Distributed resource-type WP equipment,

which by 1985 will grow to 30% of WP revenues, accounts for a very small increment today.

Users will begin to increase their use of intelligent copiers, which may well become the "primary output medium," Frost & Sullivan predicted.

Interest by users in electronic mail systems and services will grow "significant" over the next few years,

spurred on by the individual workstation market, according to International Resource Development (IRD), which also forecast that users would show only moderate interest in teleconferencing.

IRD also predicted that approximately 200,000 executives will have workstations by 1985. More information is available from IRD, 30 High St., Norwalk, Conn. 06851 or from Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

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## Professionals Considered

(Continued from Page 63)

The installation effort was coordinated by Wanda Gant, office systems analyst, and Sandy Traugher, office systems training administrator. They took a step-by-step approach that paid off in easing the conversion to the new equipment.

### Secretarial Considerations

"We had a meeting with all the secretaries who were going to be a part of the 5520 pilot program," Traugher explained. "We gave them a demonstration of the equipment and then started training on an individual basis."

"From that point on through the initial installation, we held weekly meetings with the secretaries to hear their problems and concerns. We always had an IBM systems engineer at the meetings to answer technical questions.

"Everything went beautifully. The secretaries can do almost anything on the system," she said.

### What Work

Among other things, Gant said they try to determine how much and what kind of work the professional staff would like to delegate to the secretarial force if time were available.

"We try to find out what duties would be performed during that time," Gant explained. "Is it project work or secretarial work now being performed by the professional?"

"Our emphasis is on traditional secretaries using automated office systems as a tool. We are not just concerned with word processing. We know an office system will allow secretaries to work faster, but it will also allow them to have extra time that can be used to decrease the work load of the professionals they support."

In addition, Sprague said, his unit will audit the firm's office system usage every 12 months.



# Only Competitors: Amdahl, NAS IBM Rivals Not Alarmed by Group K

By Marcia Blumenthal  
CW Staff

IBM's announcement of the 3081 Model Group K processor and associated software [CW, Oct. 26] has caused little consternation among vendors of plug-compatible CPUs.

Only Amdahl Corp. and National Advanced Systems Corp. (NAS) currently offer products that compete in the power range of the 3081 processor.

Amdahl had no immediate comment on the IBM introduction. However, because Amdahl's processors are not as heavily microcoded as IBM's, some industry analysts believe Amdahl may have some problem tracking IBM's changes.

Amdahl's high-end products are its 580-5860 system with an

estimated rating of 13.9 million instructions per second (Mips) and its 580-5880, which operates at an estimated 24.4 Mips [CW, July 13]. The new 3081 processor is said to offer 40% more performance than the original 3081, which would put it in the 14- to 15 Mips range, according to some estimates.

## AS/9000 DPC 'Edge'

NAS, with its AS/9000 DPC system rated at 15.9 Mips, is the only other U.S. firm with a plug-compatible product rivaling the 3081. The AS/9000 DPC's general architecture is very similar to the 3081 Model Group K, James Doody, director of large systems marketing at NAS, maintained.

He claimed his firm currently

holds an edge over IBM, as it will be able to deliver its system this month. He cited particularly good demand for systems in the 8 Mips and above range.

Moreover, the AS/9000 DPC, priced at about \$4.6 million complete, is competitive with the \$4.3 million price tag for the 3081. The 3081 K price does not include the 3082 processor control, 3087 cooling unit and the 3089 power unit, which together run another \$200,000, Doody said.

While NAS does not currently anticipate lowering the price of its competitive model, the firm will monitor the pricing situation, Doody said.

One of the interesting features of IBM's announcement was its Remote Operator Console Facil-

ity (ROCF), which permits local operation of remotely located 4300s.

Although IPL Systems, Inc. does not compete with IBM in the large processor market, its 4400 series targets the 4300 market.

## IPL Reaction

IPL President Stephen J. Ippolito claimed his firm's systems have remote operation capability. "We haven't been actively marketing it that way, but have been using it for remote maintenance," he said. IBM's ROCF addition will no doubt change IPL's stance on the marketability of that feature.

Ippolito also said he had expected IBM's announcement to include a smaller 4300 processor and was surprised such a product was not introduced. Some analysts had also anticipated a smaller 4300 unit, known popularly as the 4321.

Commenting generally on the software aspect of the IBM announcement, Cincom Systems, Inc. said IBM's lead time before delivery for most of its products — late 1982 and early 1983 — would permit vendors of data base products for IBM systems to fine tune their systems.

## STC on 3880 Cache: Better Solution

LOUISVILLE, Colo. — The recent IBM announcement of cache storage on IBM's 3880 control unit indicates that "IBM clearly believes there are better solutions to paging problems than the addition of main memory, even for 3081 processors," according to Gary Holtwick, manager of product marketing at Storage Technology Corp. (STC).

IBM's addition of cache storage of between 4M-byte- and 8M-byte char. enhances the value of STC's 4305 solid-state disk, Holtwick maintained. While IBM has eschewed introduction of a solid-state disk, both STC and Intel Corp. market such a product.

The 3880 Models 11 and 13 answered the question of what IBM was going to do with the empty space in the 3880. It's a replacement box for the 2305, he noted.

Holtwick said STC will introduce cache storage on its plug-

compatible 8880 control unit in the very near future. Although Holtwick declined to speculate on the introduction date for its cache feature, he did say the firm had been working on the product for more than a year and "we will provide IBM's solution along with our own."

One industry observer predicted STC would probably concentrate its effort on cache storage to improve the performance of its 8650 and 8380 disk products, rather than for paging for the 8350. This would be roughly equivalent with IBM's 3880 Model 13 announcement.

## Though Some Bonuses Cut

## Execs' Pay Found Ahead of Inflation

SANTA CLARA, Calif. — Although the recessionary economy of the past year has not seriously cut into the operations of most high-technology firms, about 13% of the companies that customarily pay bonuses to executives eliminated those bonuses last year, according to a recent salary survey conducted by Radford Associates, Inc.

Despite that anomaly, compensation increases — salary,

(Continued on Page 70)

	All Companies		Companies With Revenues More Than \$200M	
	25th Percentile	75th Percentile	25th Percentile	75th Percentile
CEO	\$90,000	\$200,000	\$230,000	\$410,000
Senior Marketing & Sales Executive	62,000	112,000	120,000	170,000
MIS Director	42,000	60,000	52,000	75,000
Senior R&D Director	50,000	83,000	80,000	100,000
Senior Engineering Director	53,000	85,000	—	135,000

Compensation at High-Technology Firms (Radford Survey)

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# Europeans Hit U.S. OA Firms for Ignoring Users

By Robert Batt

CW West Coast Bureau

SAN JOSE, Calif. — U.S. manufacturers specializing in office automation have been strongly criticized for ignoring the user in developing their product strategies.

The criticism came from a group of European business people as they recently concluded a two-week, coast-to-coast industry tour here. The group, which included senior executives from 50 large corporations in Europe, including Shell UK, ICL, Inc., Banca Nazionale di Italy and Akzo France, complained that despite the overwhelming amount of office technology in the U.S., there is no clear-cut strategy on how to put that technology into the marketplace.

## Rigid Views

"Each vendor we have visited has put forward a rigid view of their strategy for the office of the future,

based on their own product, irrespective of what any other manufacturer is doing," John Leighfield, managing director of BL Systems Ltd., a DP subsidiary of British Leyland, the UK motor manufacturer, said.

"They are adopting an almost parochial view, the implication being that users will be presented with a lock-in situation to one manufacturer's products. This is certainly not what we are looking for."

Leighfield claimed users are far more interested in those few companies that are committing themselves to developing truly international standards. Most U.S. office automation specialists, he maintained, have no interest in standards even though office technology requires multivendor interconnection.

"Office technology is a vast and diverse area and no manufacturer, not even IBM, can provide all the services required. Yet manufacturers here are not gearing up in a way that

enables the user to choose his own strategy. In fact," he said, "they are setting along paths that will deliberately prevent such a thing from happening."

## Technology-Led Move

This view was backed by other members of the group. "The overwhelming feeling I get is that where manufacturers are adopting standards, they are being pushed into it.

It is a technology-led development rather than a user-led one," Brian Smith, head of projects and financial control at the UK Central Computer and Telecommunications Agency, said.

And David Butler, chairman of the Butler Cox Foundation, a UK research organization, argued that what is missing is the middle ground required to match emerging technology to market requirements.

# Survey: 13% Excise Bonuses

(Continued from Page 69)

bonus and incentives — for incumbents working at high-technology firms stayed ahead of the pace of inflation. Their average increase was about 14%, noted Don York, vice-president and general counsel at Radford.

On the whole, salaries advanced 11.6% on the vice-presidential level and above while compensation for middle managers increased an average 9.8% — slightly behind the inflation rate.

## Few Surprises

Radford's survey results held few surprises, York reported. However, he added that his firm expects to see some manifestation of the downside economy in its 1981 survey because total compensation is tied to a company's overall performance.

High-technology firms currently pay out about 10% of pretax profits in bonuses, a finding which is in line with results shown in prior surveys, York noted.

The survey examined 40 job categories. Representative compensation levels are shown in the accompanying chart.

One highlight of the survey showed that salespeople, particularly those involved in end-user sales, earned significantly more than salespeople at OEM and semiconductor

firms. For example, the 50th percentile of compensation for those selling computer systems to end users was \$107,000, while those selling semiconductor and OEM products earned \$50,000, York said.

Moreover, end-user systems salespeople in the 50th percentile and above came closest to matching the 50th percentile compensation of chief executive officers. The median earnings of \$107,000 for this category of employee compared with the \$124,000 overall median earnings for chief executives.

## Geography Insignificant

Geographic location of firms seemed to have little influence on compensation levels, York noted, adding that this result was surprising.

Radford interviewed all high-technology electronics firms in its survey. About 50% were computer firms, 25% were semiconductor companies and 25% fell into a variety of other categories. Some 80% of the firm's were located in the Bay Area, with the remaining firms located on the East Coast.

The revenues of the firms were fairly evenly distributed: 18 companies had revenues of more than \$200 million, 24 were in the \$100 million to \$200 million revenue range, 24 spanned the \$40 million to \$99.9 million range, 48 companies had revenues of \$10 million to \$39.9 million and 26 companies had revenues of less than \$10 million.

# Seminar to Focus On Starting Business

SUNNYVALE, Calif. — Nolan K. Bushnell, founder of Atari, Inc., will be a featured speaker at a three-day seminar on "How To Start a High Growth Business," to be held here Nov. 19-22.

The event is being sponsored by the Alliance for American Innovation, a nonprofit membership association dedicated to helping along innovative individuals and enterprises. Bushnell is chairman of Alliance.

Topics to be covered at the seminar include: how to turn your idea into a business; how to organize the business; how to avoid common pitfalls leading to failure; how to prepare a business plan for raising capital; and how to make sure you've thought of everything.

The course costs \$225 for Alliance members and \$275 for nonmembers. Further information is available from the Alliance for American Innovation at 21 Sutter St., San Francisco, Calif. 94104.

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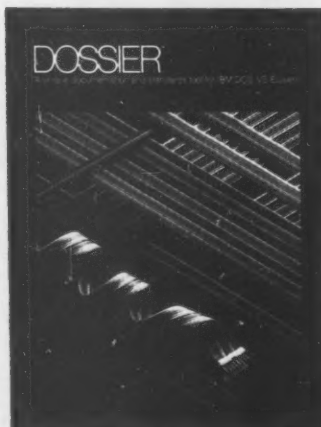
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## STC's Earnings Up 91%, Revenues Increase 64%

LOUISVILLE, Colo. — Storage Technology Corp.'s (STC) third-quarter earnings advanced 91% while revenues increased 64%.

STC's earnings totaled \$23.1 million or 71 cents per share in the latest quarter, compared with \$12.1 million or 46 cents per share in the same quarter a year ago.

Revenues for the quarter totaled \$247.4 million, up from \$150.7 million in the year-ago quarter.

For the year to date, STC's revenues totaled \$643.9 million, up 64% from the \$418.5 million reported a year ago for the same period. Earnings for the nine months totaled \$50.4 million or \$1.61

per share, up 61% from earnings of \$31.4 million or \$1.22 per share in the 1980 period.

STC President Jesse I. Aweida noted that STC's backlog of firm orders continued at record levels, especially in the disk area. To meet demand, he said, the firm has expanded its manufacturing capability and more expansion is under way.

## Nickels & Dimes

IBM has declared a regular quarterly dividend of 86 cents per share on common stock payable Dec. 10 to shareholders of record Nov. 10.

\$\$\$

CPT Corp. has called for redemption this Nov. 13 all of its 7.75% convertible subordinated debentures due Sept. 15, 2000.

\$\$\$

Datatron Rental Corp. will offer all its debenture holders to purchase for cash at \$75 net to seller per \$100 principal amount of its 7 percent convertible subordinated debentures, due March 15, 1984, up to \$300,000 principal amount.

\$\$\$

One million shares of Vector Graphic, Inc.'s common stock is currently being offered publicly at \$13 per share.

\$\$\$

Centronics Data Computer Corp. will restructure its credit arrangements. The parties involved have agreed in principle to a two-year arrangement which will provide Centronics with up to \$53 million on a collateralized basis.

## Mergers & Acquisitions

Alexander Grant & Co., a major U.S. public accounting firm, has purchased the assets of R. J. Hansen Associates, Inc., a Sacramento-based computer systems software consulting house.

Decision Data Computer Corp. has acquired the maintenance division of Computer Usage Corp. for an undisclosed amount.

## DG Reports Year-End Revenues Up 7%

WESTBORO, Mass. — Data General Corp. reported year-end revenues of \$588.5 million, up 7% from revenues of \$549.2 million in fiscal 1980.

However, the firm's earnings before an extraordinary gain was about 25% less than last year's earnings. For fiscal 1981, DG's net earnings totaled \$50.7 million or \$3.85 per share compared with \$54.7 million or \$5.20 per share last year. The net earnings figure included a \$9.8 million gain on the sale of marketable securities.

In its final quarter, DG reported earnings of \$13.7 million or \$1.30 per share com-

pared with \$16.4 million or \$1.54 per share in the year-ago quarter. Revenues for the fourth quarter rose to \$194.8 million from \$177.8 million in last year's quarter.

Commenting on the results, DG President Edson De Castro said earnings were negatively affected by inflationary costs of materials and wages, litigation costs and the strength of the U.S. dollar abroad.

He said the fourth quarter showed a "modest" growth in orders that has occurred throughout the year, with the major strength in the 32-bit Eclipse MV/8000 and MV/6000.



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## IBM Stores Number Five With Two N.Y. Additions

NEW YORK — IBM opened two retail outlets here recently, bringing the total number of retail facilities started by the firm in the past year to five. The two latest stores are located in the lobbies of two branches of the Chase Manhattan Bank.

The stores will feature assorted IBM office equipment and the new IBM Personal Computer. Moreover, cus-

tomers can order other IBM product facilities that are not sold at the retail outlet.

These new stores are managed by IBM's Office Products Division, which also operates the other IBM Product Centers in Baltimore, Philadelphia and San Francisco.

The locations here are at bank branches at 1441 Broadway and 29-27 41st Ave. in Long Island City, N.Y.

John R. Montgomery, president and founder of Product Development Services, Inc., has announced the formation of a new firm called PDS Technologies, Inc. to capitalize on the high-technology design and development capability of the existing 20-year-old company.

National Semiconductor Corp.'s "On the Line," a 37-minute documentary film on

## Supershots

the semiconductor industry, won first prize in the Employee Information category at the 25th annual San Francisco Film Festival.

The film was produced and directed by King Arthur Productions, with a grant from National Semiconductor, a spokesman said.

Westinghouse Datascope Systems, a division of Westinghouse Electric Corp.'s

Learning Corp. subsidiary, has changed its name to Westinghouse Information Services.

NEC Home Electronics (U.S.), Inc. has been formed as a wholly owned subsidiary of NEC America, Inc. The new group is structured on the basis of the former Consumer Products Division of NEC America.

QUARTERLY SALES REPORT

SALES REGION	PREVIOUS QUARTER		CURRENT QUARTER		NEXT QUARTER
	actual	target	actual	target	
Eastern	207	200	221	241	250
Southern	159	150	171	171	180
Midwest	100	100	100	100	100
Western	100	100	100	100	100
Europe	200	200	200	200	200
Canada	100	100	100	100	100
Mexico	40	40	40	40	40
Japan	90	110	110	110	110
India					100
China					100
Korea					100
TOTAL	1566	1579	1778	1834	2006

MESSAGES DAILY SCHEDULE SALES REPORT PHONE BOOK ORDER STATUS FORD CAST LETTERS SCRATCH PAD

# Haney Named Cbema Chairman

WASHINGTON, D.C. — H. Glen Haney, vice-president of strategic planning and development at Sperry Univac, was elected chairman of the board of the Computer and Business Equipment Manufacturers Association (Cbema) at its fall Meeting held here Oct. 5-6.

He succeeds James R. Melor, former president of AM International.

Others appointed to the Cbema board include the fol-

lowing: Joseph F. Ramey, 3M Co.; G. Russell Knerr Jr., AMP, Inc.; George P. Shrimme, Contitronix, Inc.; Robert D. Schmidt, Control Data Corp.; G. Millard Allen, Datapoint Corp.; Hobart C. Kreidler, Dictaphone Corp.; Theodore G. Johnson, Digital Equipment Corp.; J. Raymond Sutcliffe, Eastman Kodak Co.; Lowell K. Strohl, Exxon Enterprises, Inc.; Warren R. Rothwell, General Binding Corp.; Jack C. Davis, Harris

Corp.; Alfred P. Oliverio, Hewlett-Packard Co.; Stephen G. Jerritts of Honeywell Information Systems, Inc.; and Wallace C. Doud of IBM.

Cbema is the principal trade organization of the computer and business equipment manufacturing industry in the U.S. and is headquartered at 1828 L St. N.W., Washington, D.C. 20036.

## Executive Corner

• James A. Hill has been elected president and chief operating officer at Denelcor, Inc.

• Ted Westfall, former executive vice-president and director of ITT, has been named chairman of the board of Comdial Corp.

• Ross Forncrook has been promoted to president of the newly established Government Health Services Division at Computer Sciences Corp., and Robert Forsyth has been named president of that company's Commercial Division.

• Earl Rogers has been elected chairman of the board and chief executive officer at Precision Monolithics, Inc., and David O'Brien has been named president and chief operating officer for the firm.

• Kendall Wright, president and chief executive officer of Computer Devices, Inc., has announced plans to leave the company by Dec. 31 to pursue other interests.

• Alfred Lapierre has been named president of the Electronic Devices Division of Rockwell International Corp.

• New appointments at AGS Computers, Inc. include Lawrence Schoenberg, named chairman of the board and chief executive officer; Joseph Abrams, elected president and chief operating officer; and Anthony Stepanki, elected executive vice-president.

• David Levi has been appointed chairman of the board of directors and chief executive officer of Raster Technologies, Inc.

• Robert Cooper has been appointed assistant vice-president and managing director of international affairs at Western Union Telegraph Co.

• The election of Robert Adams as a corporate vice-president of Xerox Corp. was announced recently.

• Earl J. Jacobson has recently joined Dearborn Computer Co. as vice-president of marketing.

• Dr. Eugene Starr has been promoted to vice-president of business development for Ontel Corp.

• John Labiak has been promoted to the position of senior vice-president and treasurer at Ontel Corp.

• Michael J. Callahan has been named executive vice-president at Monolithic Memories, Inc.

• At Ohio Scientific, Inc. John Wolaver has been named vice-president of marketing and planning; Charles Bickoff has been elected vice-president, engineering; and John D. Werdman has been named vice-president of finance.

• Edward J. Harof has been

named vice-president of marketing at Chromatics, Inc.

• Meldon Gafner has been promoted to vice-president of marketing and sales at Integrated Software Systems Corp.

• Adage, Inc. has appointed Edward B. O'Brien vice-president of manufacturing.

• Blake McFeely has been named to the newly created post of vice-president, administration and general counsel, at Alpha Micro Corp.

• Michael Pollard has been appointed vice-president and controller of Wabash Tape Corp., a subsidiary of Wabash, Inc.

• John D. Vazzana has been promoted to executive vice-president at C3, Inc., and Francis Gaudette has been named vice-president of finance and administration at the company.

• Robert Iger has been named vice-president and division manager of software products at On-Line Business Systems, Inc.

• Beverly Wilson has joined Artelonics Corp. on special assignment to serve as vice-president, finance and administration.

• Donald T. Aanstad has been named corporate secretary and vice-president of finance at Western Business Computers, Inc.

• National Computer Utility Co. has elected Marshall Puterman vice-president.

• Thomas Harincar has been named vice-president of finance at Vector Graphic, Inc.

• Stephen Prendergast has been named vice-president of finance and administration at Display Data Corp.

• The Cylix Communications Network has appointed Ron Young vice-president of marketing, a new position.

• David Jorgensen has been promoted to executive vice-president at Dataquest, Inc., a subsidiary of the A.C. Nielson Co. Also at that company, Lester Gray was named vice-president of management information services.

• Steve Muth has been named to the newly created position of vice-president of marketing at ILC Data Device Corp.

• Dr. Bryan Preas has joined VR Information Systems, Inc. as vice-president of research and development, and Benjamin Thomas has been named vice-president of operations at the firm.

• Lester Querry has been named vice-president of engineering in the data communications division of Penril Corp.

• J. Richard Gensley has been named vice-president of manufacturing at Plexus Computers, Inc.

Prop up this magazine against your IN box and you'll get a good idea of how the new HP 2382 office display terminal would look on your desk. It's that small!

## It's got a price to match.

At only \$1700, the HP 2382 provides an affordable and personal "information window" for people in many different departments. They'll be able to see at a glance the information they need for responsible decision making. Whenever they need it.

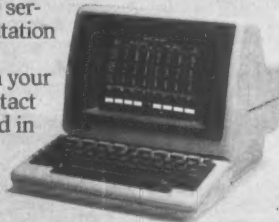
## It's very fitting.

The 2382 is really a full-capability terminal—with "big terminal" features like screen-labeled soft keys, block mode and local editing. But its compact and pleasing design makes it as easy to accommodate on the office desk as the telephone. And it's almost as easy to use.

The detached typewriter-style keyboard has a coiled cord that won't interfere with the desktop work area. And the keys have a sculptured profile and a velvet finish for a friendlier feel. There's even a deep-dish touch on the "F" and "J" keys for easy location of the "home row."

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CW 11/2

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Keyboard reproduced actual size (11" wide); CRT appears slightly smaller because of photographic perspective.

42104 HPT 60

## New Companies

**Success Analysis Corp.**, management consultants, has been registered as a California corporation as the successor to L.A. Wortman Associates, Dr. Leon Wortman, who founded L.A. Wortman Associates in 1975, has been named president and chairman of the new firm. The

company is located at 743 Holly Oak Drive, Palo Alto, Calif. 94303.

**Engineering Graphics Technology** is located at Suite D106, 11231 Richmond Ave., Houston, Texas 77215. The firm provides computer-aided design and automated

drafting services to engineering, architectural, manufacturing, fabrication and real estate development companies.

**Bytex Corp.** specializes in electronic technical control products for data communications applications. The firm is based at 29 Needham St., Newton, Mass. 02161.

Lyle Heller, executive vice-president of Data Switch Corp., is leaving the organization to form his own consulting firm to help credit unions and related organizations in the selection and installation of electronic-based data and consumer service systems. Heller & Heller will be headquartered at 6123 Knollwood Drive, Oregon, Wisc. 53575.

The formation of **Ikier Technology, Inc.**, a computer graphics system manufacturer, has been announced. It is located at 16 Sears St., Burlington, Mass. 01803.

Ken Ritchie, formerly with the American Electronics Association, announced the formation of **Sibma Associates**, management consultants to the electronic and high-technology industries. The company can be reached through P.O. Box 695, Amherst, N.H. 03031.

## Foreign Orders & Installations

Recent orders at Sperry Univac include one from a Swedish steel wholesaler, Broderna Edstrand AB, for five System 80 computers valued at \$1 million; another from a Japanese credit federation for two large-scale 1100/60s valued at \$1.6 million; and one more from the Natal Building Society, a South African savings and loan outfit, for \$4 million worth of Sperry equipment, including two 1100/60s.

Corvus Systems, Inc. has completed its initial shipment of a potential \$700,000 order for network components and Winchester-based mass storage systems for use with Atari Corp. microcomputers in Israeli schools under a government-sponsored program.

**Market Data Systems, Inc.** will provide instantaneous price data to Ciapro, a private banking firm in Sao Paulo, Brazil.

## Expansions

**Tandem Computers, Inc.** has completed arrangements for the purchase of a 20-acre site to build an electronics facility in Austin, Texas.

**Hewlett-Packard Co.** has obtained an option to purchase approximately 140 acres near Lyon, France, as a site for a proposed electronics plant.

**Cipher Data Products, Inc.** has purchased a 15-acre site in Colorado Springs, Colo., to expand its manufacturing capability.

**Com-Code Corp.** has moved to new corporate headquarters in Greater Ann Arbor Research Park, Mich.

**Datapoint Corp.** has officially broken ground for the first phase in the construction of its San Antonio, Texas headquarters facilities.

**Honeywell, Inc.'s** Small Systems and Terminals Division recently opened a new 75,000 sq-ft Office Automation Systems and Terminals Center in Billerica, Mass.

**Medlab Co.** has opened its new headquarters at 5965 S. 900 E., Salt Lake City, Utah.

which will include a customer training center along with equipment to communicate with installations throughout the U.S.

**Western Digital Corp.** has completed the relocation of its corporate headquarters to a new three-building site at 2445 McCabe Way, Irvine, Calif. 92714.

**Systems Engineering Laboratories, Inc.**, a subsidiary of Gould, Inc., has broken ground for a new 106,000 sq-ft building to house its hardware development and manufacturing engineering departments.

Plans were announced to acquire and renovate a 600,000 sq-ft building in Valley Forge, Pa., by **Commodore International Ltd.**, the parent company of Commodore Business Machines, Inc.

The Fiber Optics Communications Division of **GTE Lenkurt, Inc.** has moved to 1395 Charleston Road, Mountain View, Calif. 94043.

**Osborne Computer Corp.** has moved its production facilities to 26616 Corporate Ave., Hayward, Calif. 94545.

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## Seeks Extra \$50 Million

# AEA Forms Foundation to Meet DPer Shortage

By Robert Batt

CW West Coast Bureau

PALO ALTO, Calif. — In an unprecedented move to come to grips with the critical shortage of skilled data processing people, the American Electronics Association (AEA) has decided to put its own house in order.

The AEA has voted to establish an engineering education foundation to further computer engineering education throughout the U.S. At the same time, the AEA is asking each of its 1,500 member companies to contribute a dollar amount equal to 2% of its research and development budget to fund the new drive.

"Electronics has improved the quality of life. But the promise to do so in the future is threatened by the growing shortage of engineers, computer software and electronics in particular," Pat Hill Hubbard, AEA manager of engineering education, said in the organization's latest report, "Planting the Engineering Seedcorn — A Call for Action to Reduce the Engineering Shortage."

Many AEA members al-

ready provide support for engineering education, the group noted, but the 2% goal could provide up to \$50 million extra each year. In addition to these contributions, AEA will contribute \$50,000 immediately from its operating revenues to help launch the foundation.

"Although the foundation will be national, the approach to the problem is expected to be regional, based on the proximity of members to educational institutions," Hubbard said.

### Blue Ribbon Committee

The formation of the foundation follows the establishment of a blue ribbon committee earlier this year to look into the problem of critical manpower shortages. The committee claimed the anticipated disparity in supply and demand will reach a shortfall of more than 100,000 engineers — both electrical and computer — by 1985.

Proposals drawn up by the blue ribbon committee for dealing with the DP shortage included using funds to increase faculty salaries, funding AEA engineering faculty scholarships, promoting legislation and providing graduate fellowships to qualified engineering students.

"We have studied the problem over the past year and believe this to be the most responsible approach," William Perry, chairman of the AEA blue ribbon committee, said. "We felt that since ours is the need, and our industries possess the technol-

ogy, we are in the best position to help ourselves."

In its call for action, the blue ribbon committee recommended that attention

should be focused on alleviating faculty shortages by providing industry experts to act as part-time or full-time visiting professors. It

also recommended funding supplemental salary "chairs" and providing graduate student fellowships for students who want to teach.

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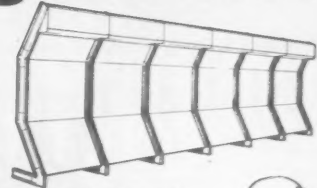
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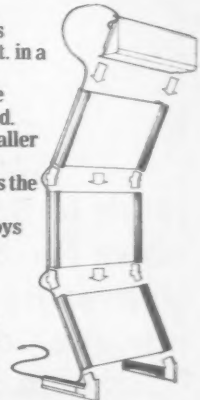
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## Contracts & Pacts

Digital Communications Corp. has received an order from American Satellite Co. for four time-division multiple-access terminals that will eventually be installed in Memphis, Tenn.; Chicago; Somerset, N.J.; and Colorado Springs, Colo., for the Federal Express Corp. network.

Tandem Computers, Inc. has contracted to purchase \$1.8 million worth of in-circuit test equipment from Zehntel, Inc.

SLI Industries, Inc. has sold 100 Cheyenne 8-in. Winchester-type disk drives to Thought Works of Phoenix.

Sysorex International, Inc. has placed a \$1.6 million order for the F/4000, a 32-bit computer system manufactured and distributed by Formation, Inc. of Mount Laurel, N.J.

RCA Corp. has received a \$4 million, four-year contract to provide system engineering and technical analysis services in the Federal Aviation Administration's program to upgrade the nation's air traffic control computers.


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New York	WOR*	9	Sat	9:30 AM
Los Angeles	KWHY	22	Sat	12:00 Noon
Chicago	WFLD	32	Sat	10:00 AM
San Francisco	KTSF	26	Sat	9:30 AM
San Jose	KSTS	48	Sun	4:30 PM
Philadelphia	WTAF	29	Thurs	10:30 PM
Allentown, PA	WFMZ	69	Sun	6:00 PM
Boston	WLVI	56	Sat	11:30 AM
Washington, DC	WDCA	20	Sat	12:00 Noon
Dallas/Ft. Worth	KNBN	33	Tues	7:30 AM & 6:30 PM
Detroit	WXON	20	Sat	7:00 PM
Atlanta	WATL	36	Sat	1:30 PM
St. Louis	KDNL	30	Sun	5:30 PM

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And speaking of checking out micros, Len Lawrence will conclude his excellent, five-part series on how to select your own micro. Then Paul Reece will take a look at the controversy surrounding the Shroud of Turin, and how computers are being used to help gather and evaluate the scientific evidence.

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Haworth, Inc., is a recognized leader in the growing office interior systems industry and is committed to a progressive and dynamic MIS department.

We offer a competitive salary and benefit package, plus a liberal relocation program. Interested individuals should respond with a resume and salary history in confidence to:

Robert J. Pruim  
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A DP professional needed to assist in the growth and expansion of a major state-wide financial institution. Successful candidate will have a minimum of 2-3 years of progressive experience with RPG-II as the major language. Preference given to financial institution background. Excellent organizational environment with a broad range of company benefits, progressive salary structure and growth opportunities. Interested individuals should forward their resume to:

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P.O. Box 22651  
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EOE/M/F/H

COMPUTER SCIENCE  
FACULTY POSITION

The Joint Center for Graduate Study, located at Richland, Washington, at the confluence of the Columbia, Snake and Yakima Rivers is a multi-institutional educational center, administered jointly by the University of Washington and Washington State University with program participation by Oregon State University. The Center is seeking a resident faculty member to coordinate its graduate program in Computer Science, sponsored by Washington State University. Candidates must hold a Ph.D. degree in Computer Science or a related field. Opportunities are available for developing collaborative educational and research programs with the sponsoring universities through the DOE Research and Development Laboratories. Knowledge and experience in one or more areas such as data bases, software engineering or hardware/software specialties is preferred. Academic and industrial experience in research, teaching and administration are desirable.

The Joint Center for Graduate Study has sole use of a PRIME 750 virtual memory computer and access to the Computer Center located on campus at Washington State University in Pullman, Washington. The appointment level for the position will depend upon the qualifications of the applicant. Applications including three letters of reference and current curriculum vitae, should be addressed to Chairmen, Computer Science Steering Committee, Joint Center for Graduate Study, 100 Sprout Road, Richland, WA 99362. Deadline for applications is February 1, 1982. An Equal Opportunity/Affirmative Action Employer.

## Computer Programmer with Design Capabilities in RPG or COBOL

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If you are an experienced programmer with knowledge of Burroughs 1800 systems, and are seeking a position with growth potential, please contact: Don Farwell, Ramsey Gilman or Barton Gilman, (713) 776-7006 (collect), Frank Gilman Pontiac/GMC/Honda, 7811 Bellvue Blvd., across from Sharpstown Center. We are an equal opportunity employer-m/f/h.

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The person we seek will have 1+ year experience in data administration, 1 year CICS and 3+ years COBOL; IMS equivalent acceptable. Our benefits include medical, dental and life insurance, profit sharing and educational reimbursement.

Any further questions regarding the opening may be referred to Pamela Mitchell, (602) 949-9717, Ext. 577. Please respond by mail to the address below. All responses are held in the strictest of confidence. Principals only, please.



**McGRAW-EDISON**

P.O. Box 20188  
Phoenix, Arizona 85036  
ATTN: Pamela Mitchell

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SYSTEMS ANALYSTS  
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Join Information Sciences, Inc. (ISI), the data processing subsidiary of Industrial National Corporation, a \$3.7 billion bank holding company and join a company with a future. ISI not only provides computer services to InCorp, which has a financial service network of 217 offices in 24 states, but also services municipalities in over 600 other companies in New England.

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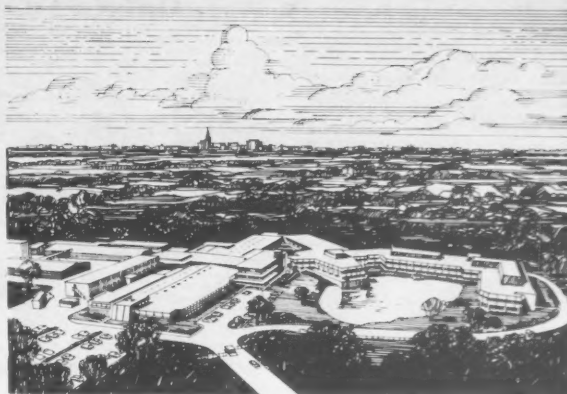
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Battelle's Computer Science and Information Department, a leader in applying computer and information processing technologies to real world problems, has the following immediate openings for experienced individuals:

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• **SYSTEMS PROGRAMMER/ANALYST** - Minimum of 2 years' experience in systems programming including operating systems maintenance, DEC VAX or CDC CYBER experience required. Requires good communicative and customer relations skills. Knowledge and experience in data communications helpful.

We offer competitive salaries and excellent benefits, including liberal vacations and a convenient opportunity for further education at nearby Ohio State University. Send resume indicating position of interest, in confidence to: Carole Paquin, Senior Personnel Advisor, c/o CW-A3117, Computerworld, Box 880, Framingham, MA 01701

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Knowledge of assembly language and/or PASCAL for mini or micro-processors is essential. Experience with typesetting, text editing or graphic images would be helpful.

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San Diego is the capital of the active life. It's amazing how wide a range of housing options still remain, considering that the weather is ideal for a year-round pursuit of outdoor recreation. And NCR Systems Engineering - Scripps Ranch, affords you an active career as well. The Systems Developer who thrives on research, design and development challenges in electronic data processing systems can find an environment here to grow and succeed. In short, the following opportunities at NCR can fulfill your life, both during the week and on the weekend as well.

### Communication And Tools Developers

Perform design, development, specification, test and support of software components. Several areas involve communications management software, terminal and network interfaces, and PASCAL-based compiler enhancements. BSCS degree plus 3-7 years software development experience in tools, compilers, data communication and high-level block structured languages.

### Systems and Applications Programmer Analysts

Use latest concepts in software and systems evaluation to conduct product test definition, product specification and quality evaluation. Involves interactive business operating systems, CODASYL and TOTAL Data Base Management Systems. Software and systems quality assurance, and systems communication. BSCS plus 3 years experience and knowledge of user environments required.

### Software Integration Analysts/Programmers

Perform functional specification review, test bed development, results monitoring and evaluation, and microcode integration. Develop tools for software/firmware source object control systems. One project leader position. BSCS plus 2-5 years experience with assembly language programming, PASCAL/COBOL, microcode, and some application programming.

### Interactive Systems Architects

Be a technical contributor in a senior level group tasked with defining the architecture for advanced transactional and interactive processing systems. Key areas include OS Kernel, performance modeling and BLSI based hardware in small to medium systems. BSCS/advanced degree preferred plus minimum 10 years business system experience.

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Develop and demonstrate advanced Data Base Management technology, addressing long range requirements and next generation hardware. BSCS/MSCS level preferred with broad systems experience in building or using sophisticated data base systems. Possess state-of-the-art awareness of technology and market trends.

### Performance Measurement Analysts

Create and develop performance monitors and synthetic benchmarks; measure and analyze software systems performance. DBCS/BSSE and 1-3 years operating systems development experience required, plus performance measurement background preferred.

### Firmware Systems Analysts

Design and implement firmware for next generation distributed/processing systems. Includes work in micro programming, virtual machine evaluation, I/O processor/system console firmware interpreters, and VLSI-based systems. BSCS degree plus 1-3 years firmware design experience, assembly language programming, I/O, PASCAL or COBOL required.

### Testware Development Analysts

Develop testware involving diagnostic programs for mainframes and peripherals, write dedicated drivers and concurrent peripheral diagnostics. BSCS degree with 5 years experience, knowledge of assembly language, PASCAL, microcode, and some COBOL highly desirable.

The choice is yours. San Diego's appeal to both family and singles lifestyles, and the wealth of recreation, coupled with NCR Systems Engineering's dynamic career challenges, make up a package you should look into. Put some enjoyment back into your life. Apply for the position of your choice by sending your resume to:

Mr. Doug Sjoberg, Personnel Resources, Systems Engineering - Scripps Ranch, Dept. P54, NCR Corporation, 9900 Old Grove Road, San Diego, CA 92131. (714) 288-5372.

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Leading Florida retailer is looking for an aggressive COBOL Programmer Analyst. Minimum of five years experience in new program development required. NCR medium to large scale mainframe experience desired. Knowledge of Cincom, TOTAL, Data Base and NEAT/3 a definite plus.

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The person we are looking for will be a data security professional with a strong administrative background that will enable him/her to organize, implement, and manage a Data Security Department.

This key member of our staff will develop standards, procedures, and guidelines for ensuring data and physical security including:

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Physical security of the data center and other facilities

This person will possess a background in both software and hardware programming, communications, data base management, and state-of-the-art physical security. Knowledge of RACF and/or ACF 2 would be a plus.

Our firm can provide you with a challenging, highly visible career in a sophisticated on-line, data base management environment, with a strong requirement to maintain high standards for data security.

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Peter J. Vaneto  
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160 University Avenue  
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We will be at the Eighth Annual Computer Security Conference on November 9-11 in New York City. Interested applicants will be interviewed at that time. Look for our ad and suite number posted at the conference.

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Develop and implement models to forecast demand for natural gas; mathematical programming, network analysis, regression analysis, multivariate analysis, risk analysis; MS Operations Research, Quantitative Economics, Industrial Engineering or equivalent.

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Berlinda Fontenot, Professional Employment Representative

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3 years exp. or 3 years in Programming. 4 years High School. Must have knowledge of COBOL. Design & implement computer systems related to financial institutions. Maintenance & enhancement of these systems & provide vital skills which ensure their successful & cost effective operation. \$482.00 per week to work 40 hours/5 days/week. Please send resume to: **Computer Technicians, Inc., 646 Highway 18, East Brunswick, NJ 08816.**

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This individual will be assigned to various design and programming projects within the Financial and Manufacturing areas. Requirements for this position are a minimum of 2 years experience with System Design and Programming of C.I.C.S., DL/1, COBOL application.

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The Quantitative Cytopathology Laboratories of The Johns Hopkins Medical Institutions seeks a productive Associate Computer Scientist to design and implement computer software for cell image analysis applications in an expanding cancer detection and diagnosis research program.

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Forward resume and compensation requirements, in complete confidence, to Mr. James T. Fisher, Professional Recruitment.

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Employment Manager



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Applications and nominations are invited for the position of Director of the Computing Center at Virginia Polytechnic Institute and State University. VPI & SU is Virginia's land-grant University and is located in the beautiful mountains in the southwestern section of the Commonwealth. Its enrollment of 20,000 students is distributed among eight degree-recommending colleges.

The Director of the VPI & SU Computing Center will be responsible for managing all aspects of a large and complex computing operation. The Center has an IBM 3032, an IBM 370/158 AP, an IBM 4341, a VAX 11/780, and a Honeywell 68/60 Multics System. The total budget consisting of personnel and operating costs is in excess of 5 million dollars. The Director will be responsible for managing a very qualified and able staff, and for providing computational services to the academic, research, instructional, and administrative users. Management experience and good interpersonal skills are considered essential. Preference will be given to candidates with a Ph.D. in Computer Science, Engineering, Business, or related fields. The position is primarily administrative, but can provide for a limited amount of instruction and/or research activity if so desired.

The salary for this position is open and commensurate with the selected candidate's qualifications and experience. The Applications and nominations will be accepted until November 20, 1981 and should be sent to:

Dr. Vinod Chachra, Assistant Provost  
Planning and Information Systems  
201 Burruss Hall  
Virginia Tech  
Blacksburg, VA 24061

Applications should include a curriculum vitae and the names of at least three persons to whom the search committee can turn at the appropriate time for assessments of the candidate's strengths and experience. Confidentiality requirements of the candidate will be strictly observed.

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BSEE with at least 2 years' experience in digital design using TTL/LS/S and/or processors T1990 or 9900. Responsibilities include circuit design for various data communications equipment.

BSEE with 4 years' experience in digital design. Additional experience with microprocessor at both a hardware and software interface level required. Responsibilities include the design, development and support of various developmental data communications equipment.

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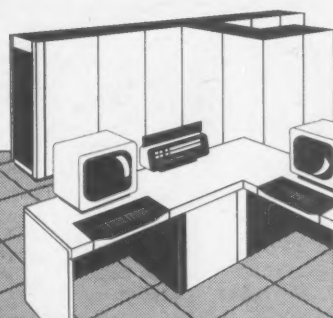
Here's an opportunity to develop both customer and internal benchmarks. Working in our large systems center, your responsibilities will include floor system preparation, benchmark performance data evaluation, and workload measurement studies. You'll need extensive MVS systems programming experience (RMF, SE, SP, Data Facility, etc.), knowledge of systems tuning techniques, and a background in systems evaluation. VM programming experience a plus.

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A position is available for a senior level person to provide in-depth technical support in maintaining, operating, and procuring computer systems and related equipment. This person will manage the system software environment necessary to support an IBM 370/158, 4341, PDP 11/44, HP 3000, and other computer systems. Also, acts as consultant to management, staff, faculty, and students on highly technical matters involving computer systems. Degree in Computer Science is preferred with minimum of 5 years experience in system development/analysis and 2 years in a management capacity. Excellent communications ability is a must. Salary range is \$24,000.00 - \$28,000.00, dependent upon qualifications. Application deadline - November 20, 1981. Please send resume to: Milton Hutchinson, Director, Computer Support Services, Ohio University, Hanning Hall, Athens, Ohio 45701.

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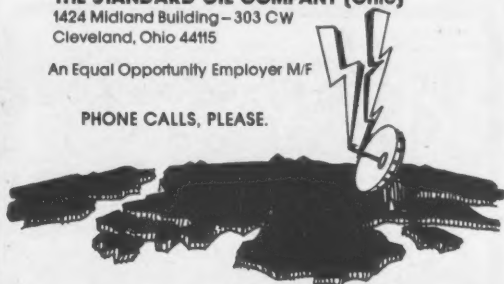
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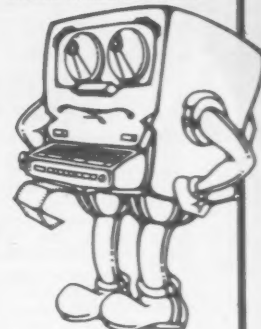
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### QUALITY ASSURANCE (Computer Software)

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University of North Carolina at Charlotte

**Position:** Director reports to the Vice Chancellor for Academic Affairs and has primary responsibility for all aspects of campus wide computing including academic, business, and student records. The individual must be prepared to develop and promote policies to enhance the quality and quantity of computing at UNCC and must provide leadership in the use of computing technology in all academic applications. Must also maintain close contact with various user departments and committees in order to evaluate and respond to their development needs.

**Qualifications:** Qualified candidates must have demonstrated success in the EDP field, excellent administrative and management skills and state-of-the-art technical knowledge along with experience in administering and delivering services to the full range of users in a campus environment. Bachelor's degree required. Advanced study desirable.

**University:** Located in the largest urban center in the Carolina's, UNCC is an established and growing institution with approximately 10,000 students and 1,200 faculty and staff. UNCC is committed to expanding the use of computing technology in a wide variety of applications.

**Application Procedure:** The salary, supplemented by a comprehensive fringe benefit program will be competitive and commensurate with qualifications. Closing date for application is Dec. 1, 1981 with position available after Jan. 1, 1982. Letters of application including a resume and names of three references should be addressed to:

Dr. Robert Snyder

College of Engineering

UNCC Station

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The Campus Director of Computing Services reports directly to the Chancellor of the University of Nebraska at Omaha and is responsible for the planning, development and implementation of computing services on the University of Nebraska at Omaha campus. Representing the UNO Campus as a member of the University of Nebraska Computing Policy Advisory Board, the Campus Director of Computing Services will be directly responsible for approving the acquisition of computing related hardware, software and services and the appointment and supervision of campus data-processing personnel.

Applicants should have a minimum of a Masters Degree preferably in Computer Science or a related area and have five years progressive experience preferably in a top level management position in a University or higher education computer services environment.

Salary will depend upon qualifications with the salary range to be approximately mid-to-upper \$30's. For full consideration, applications must be post marked by December 1, 1981 and include a complete resume of education and experience with the names and addresses of at least three personal references. Send applications to:

Chairman, Campus Director for  
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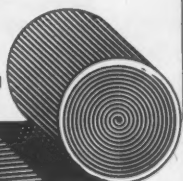
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# VAX 11/780

American Dade, a multiplant division of American Hospital Supply Corporation is a leader in the development of diagnostic products, instrumentation and labware used in clinical laboratories.

We are actively recruiting for a Systems Manager to direct the activities of a new VAX 11/780 installation.

Ideal candidate will have 4-6 years interactive computer experience in a laboratory/research environment with the last 1-2 years as a Systems Manager for a VAX/VMS system.

If you have good interpersonal skills, a working knowledge of data communication and laboratory computer systems, and wish to be involved in a 1 million dollar installation from the beginning, this opportunity may be for you.

We offer the successful candidate a comprehensive benefit package and competitive salary program. For consideration please forward your resume in confidence to Ray Angelo, Personnel Manager.

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Division of  
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Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Everyday new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Reichle, CPC, Data Processing Specialist.

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Bachelor's degree in the field-related field and two/three years experience in the field-related field. Submit letter of application, resume, transcripts and three letters of reference/recommendation by 30 November 1981 to: El Paso Community College, Personnel Dept., Box 20500, El Paso, TX 79998; telephone: (915) 594-2175. EOE, m/f.

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We desire candidates with Degrees in Systems Engineering, Management Information Systems, Computer Science or related equivalent experience with a technical telecommunications background. You will be involved in technical customer sales presentations and projects and will need a knowledge of systems and applications programming plus sales aptitude.

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For immediate confidential consideration please submit your resume to Sue Wells:

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Required background includes a technical degree in a related field such as computer sciences, electronics, mathematics, etc. Five years working in one or more of the technical areas including experience in either theoretical research or applications development. Good communications skills are essential. You will be working with various experts in your field at the leading universities, R & D institutions, and other centers of excellence. Membership and participation in professional and industry societies, publications in professional journals or teaching at the university level is highly desirable.

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### Manager, Simulation and Real Time

Responsible for business planning to increase penetration in market segment. Locate and qualify required application software and hardware, conduct sales seminars, develop product literature and assist in sales support activities. Ideal candidate to have BSEE and at least 3 years experience in the marketing or technical support of Simulation or Real Time systems.

### Manager, Software Development Systems

Participates in the development and implementation of marketing and sales strategy to insure continued growth and penetration in focus market. Locate and qualify required application software, conduct sales seminars, develop product literature and assist in sales support activities. A BSEE or BSCS and at least 3 years experience in the marketing or technical support of software development systems.

## PRODUCT MARKETING

### Manager, CPU/ Systems Marketing

Assures that all computer systems products meet market requirements and the company's current and near-term financial objectives from product inception through EOL. Functions include sales support, product strategy, pricing, forecasting, cost reduction, market segment penetration and product planning. This position requires significant experience in the mini-computer industry with a demonstrated track record.

### Manager, Peripherals and Communications Marketing

Develops business and marketing plans and manages peripheral and communications product lines from market requirement and inception through introduction, initial sales, device enhancements to EOL.

### Manager, Market Requirements

Assures that Harris Computer Systems' products and marketing strategies are appropriate to industry needs, growth trends and the competitive environment. Will support field sales needs for competitive analysis in general market areas or in specific sales opportunities and will have responsibility for maintaining the consolidated pricing manual for all products.

Send resume in strictest confidence to: Winton Boone, Director, Personnel, HARRIS COMPUTER SYSTEMS DIVISION, 2101 W. Cypress Creek Road, Fort Lauderdale, Florida 33309.

### Product Marketing Manager, External Software

Will perform technical and make-buy analysis of third-party software and negotiate and manage third-party software development projects. Functions include development of and presentation of business plans, pricing, sales brochures, and sales support. Minimum of three years experience in HQ Software Marketing.



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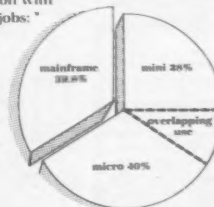
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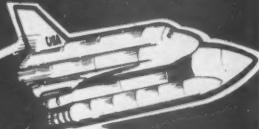
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## DP OPPORTUNITIES



Martin Marietta Aerospace, NASA's designated Contractor for the Space Shuttle External Tank Program has the following immediate opportunities at their Michoud Assembly Facility in suburban East New Orleans:

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Duties include: Teaching undergraduate computer courses; academic and career advancement.

Requirements: Two years computer experience in business environment. Knowledge of COBOL and one other language. Master's Degree.

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1. A four year Computer and Information Systems degree to produce an employable business programmer.

2. A two year Computer Technology degree to produce an employable data entry, computer operator, or junior programmer for small computer centers.

Position available: January, 1982. Want more information on salaries, duties, 20 year retirement?

Call collect Larry Morrison: (318) 357-5595. Deadline for submitting applications: November 15, 1981.

Applications: Send resume to:

Larry Morrison, Director  
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Systems Division  
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### Electronic Systems Division

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Temporary position (sabbatical replacement) available for 1982-83 academic year. Also possible to begin in the spring of 1982 and run for three semesters. Master's in Computer Science or related area required. Teaching, industrial or business experience required. Should be able to service upper-division courses and assist in continuing development of B.S. program in computer and information science. Salary and rank is dependent on qualifications. Fully paid life, dental, health and optical insurance. Apply by November 15, 1981 including a resume, curriculum vita and three letters of recommendation to Dr. Thomas L. Pinot, Search Committee, Department of Mathematics, Kutztown State College, Kutztown, PA 19530.

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Requires a degree in Computer Science or related field and at least 3 years COBOL programming experience. A working knowledge of system analysis and design preferred.

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Requires 2-5 years programming experience and at least 1 year in application systems design and analysis. Degree in Computer Science or related field and exposure to data base application design preferred.

Environment includes IBM 3031AP, MVS, TSO, CICS, IMS and DB/DC Data Dictionary.

Excellent compensation package includes health, dental and life insurance benefits, stock purchase plan, educational support. If you are interested in living in Lincoln, Nebraska, we offer data processing positions with a company which provides the opportunity to integrate the technology of computing and communications, and recognizes and rewards ability and contribution. Please send your resume salary requirements to:



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### Computer Science Teaching

Bachelor's required, master's or advanced study preferred. Experience in computer science and knowledge of FORTRAN, COBOL, and BASIC. Teaching or hands-on experience required. Primary duties in teaching and an opportunity for some work in administrative computer operation. Salary negotiable. Application deadline Nov. 20, 1981. Interested candidates should obtain an application from Lake Sumter Community College, Personnel Office, Leesburg, FL 32748.

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### SYSTEMS PROGRAMMER

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### APPLICATIONS PROGRAMMER

Monmouth College Computer Services seeks qualified applicants who have at least one year experience or a degree in Computer Science. Experience should include at least one of BASIC, COBOL, or FORTRAN and an on-line environment. The successful candidate will work independently in an on-line environment stressing new systems development and integration. Salary \$15-17,000. The usual fringe benefits, Blue Cross-Blue Shield, life insurance, etc., apply as well as tuition remission in our undergraduate and/or graduate disciplines for self and dependents. Letters of application with resume including salary history, should be received before Nov. 13, 1981 by John Huzinski, Director of Computer Services, Monmouth College, West Long Branch, N.J. 07764.

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Send resume to Dr. Michael T. O'Hair, Director, Division of Purdue Technology, Indiana University at Kokomo, 2300 South Washington Street, Kokomo, Indiana 46902. An equal opportunity/affirmative action employer. Apply as soon as possible.

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If you're looking for challenge and growth in your career, no one can offer you more exciting opportunities in Information Services than Bechtel, a world leader in the Engineering and Construction Industry. With expansion into new markets and technologies, we can assure you of growing challenges in the Information Services Organization located in our San Francisco world headquarters, as well as offices located in Walnut Creek, California; Los Angeles County, California; Ann Arbor, Michigan; Gaithersburg, Maryland; and Houston, Texas.

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#### The Environment:

Central Computer Services—UNIVAC 1100/80s and IBM 3033

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
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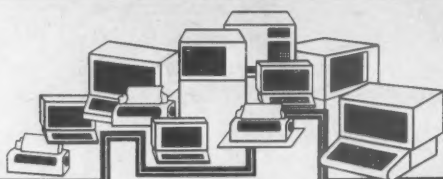
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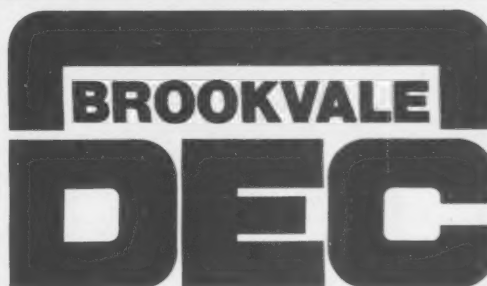
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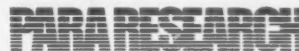
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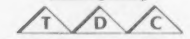


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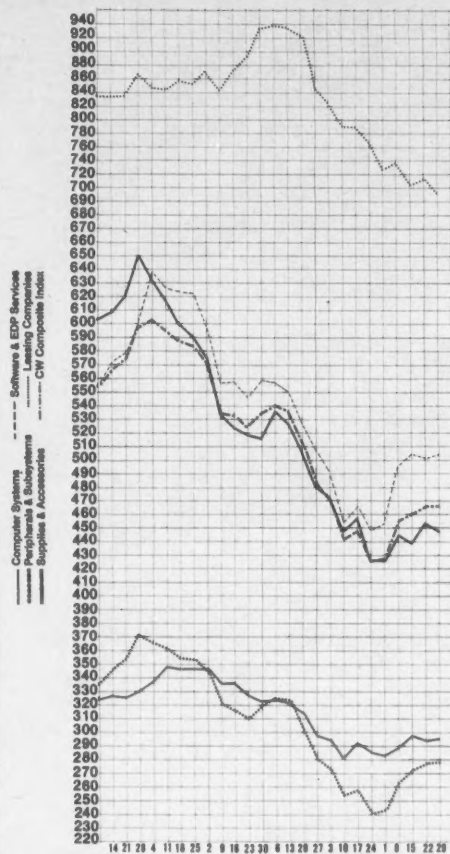
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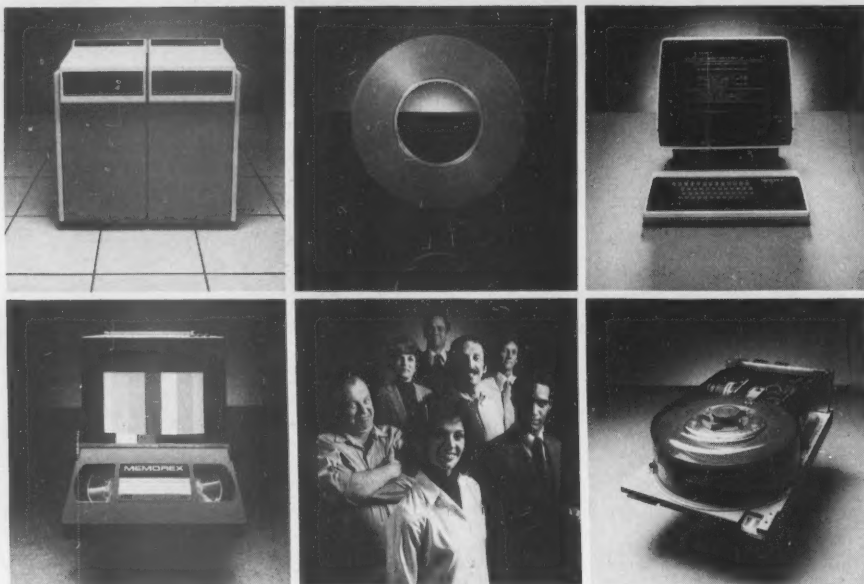
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